DOCUMENT RESUME

ED 273 685 TM 860 622

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TITLE Creating a Center for Education Statistics: A Time for Action.

INSTITUTION National Academy of Sciences - National Research Council, Washington, DC. Commission on Behavioral and Social Sciences and Education.; National Academy of Sciences - National Research Council, Washington, DC. Committee on National Statistics.

SPONS AGENCY Department of Education, Washington, DC.
PUB DATE 86
CONTRACT 300840164
NOTE 87p.; A report of the Panel to Evaluate the National Center for Education Statistics.
AVAILABLE FROM Committee on National Statistics, National Research Council, 2101 Constitution Ave., N.W., Washington, DC 20418.
PUB TYPE Reports - Evaluative/Feasibility (142)

EDRS PRICE MF01/PC04 Plus Postage.
DESCRIPTORS *Data Collection; Educational Assessment; *Educational Policy; *Educational Research; Federal Programs; Longitudinal Studies; National Programs; National Surveys; *Program Evaluation; Program Improvement; Public Agencies; Research Design; *Research Problems; Resource Allocation; Standards; *Statistical Data
IDENTIFIERS *National Center For Education Statistics; Timeliness

ABSTRACT

At the request of the Office of the Assistant Secretary for Educational Research and Improvement, the Panel to Evaluate the National Center for Education Statistics (NCES) was established in 1985 by the National Academy of Sciences. This report culminates an extensive two-year study of NCES and reflects the panel's broad view of the center's serious problems. The study had four major aspects: (1) to review, describe, and assess existing data quality and quality assurance processes; (2) to review, describe, and assess program content and services and procedures used for establishing priorities consistent with the Congressional mandate; (3) to review and assess the timeliness of data collected and disseminated; and (4) to identify issues hindering NCES in the successful accomplishment of its mission. The panel recognized that the center will require increased funding, but funding requests should be judged against the progress of the center in meeting standards; and reflect the expected expansion of data collection. The panel's comprehensive recommendations addressed the following areas: (1) mission, role, and responsibilities; (2) content and direction of data collection programs; (3) establishing a frame of reference; (4) the advisory council; (5) improving data quality (redesigning the elementary/secondary data programs, reducing error, and statistical standards); (6) timeliness; (7) staff and budget resources; (8) contracting out; and (9) publications policy. The panel recommended that serious consideration be given to abolishing the center and finding other means to obtain and disseminate education data if wide-ranging actions are not undertaken to change both the image and reality of the center. Appendices include the center's organizational structure and biographical sketches of panel and staff. (LMO)

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Creating a Center for Education Statistics: A Time for Action

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Creating a Center for Education Statistics: A Time for Action

Daniel B. Levine, *editor*

Panel to Evaluate the National Center for Education Statistics
Committee on National Statistics
Commission on Behavioral and Social Science and Education
National Research Council

NATIONAL ACADEMY PRESS
Washington, D.C. 1986

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This report has been reviewed by a group other than the authors, according to procedures approved by a Report Review Committee consisting of members of the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine.

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Available from:

Committee on National Statistics
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Acknowledgments

The panel wishes to thank the many people who contributed to the preparation of this report. The staff of the Center for Statistics (formerly, the National Center for Education Statistics, NCES) has been extremely forthcoming in its willingness to share with and educate both panel members and staff. First Lee Eiden and then Francis Corrigan, who served as liaisons from the center to the panel, gave freely and often of their time and expertise and were tireless in meeting our many requests for both information and exposure to the center, its staff, and its programs. The number of center staff who contributed to our knowledge is beyond our capacity to acknowledge individually; to each of them, however, we extend our appreciation.

Special thanks are due Emerson Elliott, director of the center, who generously made himself available throughout the study and shared his thoughts and experience. Donald Senese, Assistant Secretary, Office of Educational Research and Improvement, who initiated the study, and his successor, Chester Finn, who strongly encouraged the panel in its endeavors, provided invaluable support. Dorothy Gilford and Marie Eldridge, who served previously as administrators of NCES, shared their wealth of experience with the panel and provided unique insights into the workings of the Center and its constituencies.

The panel also benefited from information and expertise offered by staff of other groups within the Department of Education that have been involved with the work of the center, including the Office of Vocational and Adult Education, the Office of Planning, Budget and Evaluation, and the Office of the Assistant Secretary for Educational Research and Improvement. Among the broader community of users of education data, we are indebted to William Pierce, George Rush, and Ramsey Selden of the Council of Chief State

School Officers; John Stiglmeier of the New York State Department of Education; Frank Windsor of the Maryland State Board of Education; Douglas Connors of the American Association of Collegiate Registrars and Admissions Officers; James Hyatt of the National Association of College and University Business Offices; Gene Bottoms of the American Vocational Association; Charles Hopkins of the Oklahoma State Department of Vocational Education; Gordon Swanson of the University of Minnesota; Katherine Wallman of the Council of Professional Associations on Federal Statistics; and Elaine El-Khawas of the American Council on Education.

Thoughtful and helpful comments on our report were received from the many reviewers within the National Research Council, including members of the Committee on National Statistics and of the Commission on Behavioral and Social Sciences and Education. The efforts of Eugenia Grohman, associate director for reports of the commission, in editing, commenting on, and reorganizing the report were especially valuable in preparing the report for publication.

I also wish to thank the panel members for their generous contributions of time and expert knowledge. Many of them prepared background or supporting materials for discussion and contributed draft sections for the report, and detailed comments on the various drafts were forthcoming from virtually all of the members. Our report, and especially, the recommendations, are the result of syntheses of their efforts, ideas, and insights on the issues addressed and, for that reason, my task was made easier and more rewarding.

Finally, both for the panel and myself, I would like to express thanks to the staff for their commitment, dedication, and efforts. Daniel B. Levine, who served as study director, in collaboration with Anne Sprague, and assisted by Bernard Michael and Michael Cohen, consultants, worked long and hard, endured (and sometimes dodged) the misaimed slings and arrows of panel members, produced a cohesive synthesis of our debates, discussions, and conclusions, and rewrote patiently to accommodate comments from all directions. We and the education community are indebted to them.

Vincent P. Barabba, *Chair*
Panel to Evaluate the National
Center for Education Statistics

Summary Statement of the Panel

In late 1984 the National Academy of Sciences was asked by the Office of the Assistant Secretary for Educational Research and Improvement of the U.S. Department of Education to undertake an evaluation of the National Center for Education Statistics (NCES). The request was a reflection of the expressed concern that the center had lost the confidence both of those providing data to it and of those who used its products, that the quality of its products had declined, that it failed to provide its data in a timely fashion, and that its interpretations of those data it did provide were flawed.

At the same time, an educational reform movement had brought education statistics into what is likely to be the center of policy debate for years to come. The educational reform movement burst onto the public agenda in early 1983 with the issuance of the first of the reform reports from the Department of Education's Commission on Excellence in Education (U.S. Department of Education, 1983). The spate of reports that followed from a multitude of groups laying claim to the issue relied on data from the center, among other sources, to provide the evidence for declines in quality and to argue for specific solutions, such as increasing high school graduation requirements in mathematics and science.

This situation provides a dramatic illustration of the power of data to fuel a policy debate and of the changing demands for data that come with the recognition of a crisis. How can policy makers identify needed intervention points? How can society increase the amount of educational output? How will people know if reforms have been effective? The demand for data to help answer these and other questions has thrust the center forward and promises to keep it there for a long time.

To carry out the study requested by the department, the Panel to Evaluate the National Center for Education Statistics was established in January 1985 under the Committee on National Statistics of the National Research Council. The study had four major aspects:

- to review, describe, and assess existing data quality and quality assurance processes by NCES, including standards and guidelines for conducting surveys and releasing and publishing the data, and procedures used to ensure accuracy, reliability, and validity of the data as well as ensuring consistency and uniformity over time.

- to review, describe, and assess program content and services of NCES and the procedures used for establishing priorities consistent with the congressional mandate.

- to review and assess the timeliness of data collected and disseminated by NCES.

- to identify any issues that obstruct or hinder NCES in the successful accomplishment of its mission.

The panel's activities included interviews with appropriate officials and experts within the center, the Department of Education, and the federal government; with members of the department's Advisory Council on Education; with representatives of many of the education organizations and professional groups concerned with education; with other users of education data; and with providers of the data to the center. The panel drew on the expertise and advice of other committees and panels of the National Research Council whose interests extend to the use of education statistics. The panel also reviewed an extensive body of materials, including the annual reports of the advisory council, reports of previous reviews, internal memoranda, and relevant correspondence.

The panel began its activities with the full intention of approaching the issues through examination of individual programs. We soon found, however, that the center's problems, rather than being unique to particular programs, extended throughout the center. Thus our report focuses on issues rather than programs.

The report culminates an extensive two-year study and reflects the panel's very broad view of the problems of the center. We have addressed the problems both from the reali-

ties of the past and present and from the longer-range perspective of the center as we perceive it in the years ahead. Simply put, we have found the center wanting.

We believe that the discussion and recommendations in our report provide a realistic approach to dealing with the issues and problems that the center faces and that actions such as those we recommend are critical to its survival as a credible organization. Neither our findings nor many of our recommendations are startling in nature; rather, they tend to echo or expand what has been said by previous groups that have explored the same issues. However, because we believe education issues are now so urgent, we place more emphasis on comprehensive action than did past reviews.

Given that the need for information about education is beyond argument, in this report we outline a goal that is within the grasp of a statistical agency working in the difficult environment of the federal government with its disparate objectives and multitudinous demands on budgets and staff. To a large extent, the actions we propose, to a large extent, are inherent elements in the operating philosophies that guide such respected statistical organizations as the Bureau of the Census, the Bureau of Labor Statistics, the National Center for Health Statistics, and the Energy Information Administration. In essence, we seek to institute changes at the Center for Statistics for which there is ample precedent.

As we make clear in the report, the center's problems extend throughout its full program; thus, our recommendations are a comprehensive and integrated set. Our proposals provide a package that, when taken as a whole, will initiate and reinforce a process of improvement. The approach is realistic--not radical. The changes we propose cannot be effected overnight, or even in a year. But they can begin with the initial and fundamental steps of improvement.

Simple tinkering--selecting a suggestion here, reorganizing a bit there, adding a memo, deleting a regulation--has not worked and will not work, as the history of the past 25 years shows. Such self-deception, represented by quick-fix approaches, merely reinforces the already unacceptable status quo. The overriding issue before the Department of Education and the Center for Statistics is one of intent, commitment, and leadership.

It is appropriate at this point to state unequivocally that we are not proposing to solve the center's problems merely by throwing money at them. While the center does require immediate additional staff, and thus some incremental additional funding, just to carry out its current workload, we

firmly believe that the center, by implementing many of our recommendations, can significantly improve its operations without additional large infusions. Certainly, the panel recognizes and accepts that over time the center will require increased funding, but such requests, first, should be judged against the progress of the center in meeting the standards expected of it and, second, should reflect an expected expansion in the types and scope of data the center collects as it demonstrates an ability to meet the diverse needs of its users.

We wish to emphasize the seriousness with which we view the center's problems. We believe that there can be no defense for allowing the center to continue as it has for all too long. If, indeed, "the nation is at risk" in the area of education, it is past time for those in positions of responsibility to acknowledge the risks and dangers of perpetuating the myriad and continuing problems of the center. Without strong and continuous commitment and demonstrated determination to undertake wide-ranging actions to change both the image and reality of the center, we are unanimous in our conviction that serious consideration should be given to the more drastic alternatives of abolishing the center and finding other means to obtain and disseminate education data. A number of potential alternatives to the center exist, such as placing leadership responsibility elsewhere in the department and collecting the needed data through contracting with another federal statistical agency or with the private sector, through a federally funded nonprofit research center established by the department at the direction of the Congress, or through directing other entities within the department to accomplish the task.

We emphasize strongly, however, that we believe the preferred course of action is to begin the process of improvement. As we have noted, the center's problems are longstanding and pervasive, but if faced openly they can, in time, be overcome. As for this report--and its many predecessors --perhaps our thought is best expressed in the words of Sir Francis Bacon:

> Crafty men condemn studies
> Simple men admire them
> Wise men use them.

1

Education Statistics: History and Problems

A BRIEF HISTORY

In 1867 Congress established a Department of Education and, in the first section of the legislation, gave it a primary mission of "collecting such statistics and facts as shall show the condition and progress of education in the several States and Territories, and of diffusing such information respecting the organization and management of schools and school systems and methods of teaching." Congress further provided for the Commissioner of Education to present annually "a report embodying the results of his investigations and labors, together with a statement of such facts and recommendations as will, in his judgment, subserve the purpose for which this department is established." Thus in the department's earliest incarnation, the need for and importance of statistics was both recognized and established.

During the ensuing 30 years, the Commissioners of Education focused the efforts of what by then had become a Bureau of Education on the collection and reporting of school statistics, such that one scholar observed "that the phrase [reporting of school statistics] became a definition of the bureau itself" (Warren, 1974:163). The first index to its publications was issued in 1891 and covered the Bureau's efforts between 1867 and 1890. Containing over 100 pages, the listings are almost equally divided among historical sketches, descriptive pieces, and statistical summaries (U.S. Bureau of Education, 1891). Even at this early point there was recognition of the need to interpret the facts. For example, in its annual report for 1897, two chapters were devoted to a descriptive analysis of program data acquired by the office; in 1902, the annual report dealt with the subject of black student enrollment in higher education; and in 1903, the education of women was a focus of discussion.

This focus on the collection and dissemination of education statistics by the Bureau of Education (and, later, the Office of Education) continued more or less unabated throughout the first half of the twentieth century, even as the organization lost its independent status and became a part of the Department of the Interior (1868) and eventually settled within the Federal Security Agency (1939), which later became the Department of Health, Education, and Welfare.

The National Center for Education Statistics appeared in January 1965, having been established as a staff office reporting to the Commissioner of Education. The idea for a center originated from the recommendations of a public advisory commission and a White House task force "to provide for education, the statistical expertise and products which the Bureau of Labor Statistics provides for Labor, the National Center for Health Statistics for Health, and the Agricultural Reporting Service for Agriculture" (Ottina, 1973). The center assumed responsibility for all of the general purpose data gathering within the Office of Education and for helping states, through a program of grants, improve their own data-gathering and statistical capabilities.

The federal education programs of the Great Society, initiated during the administration of President Johnson, placed new and heavy demands on the very limited resources of the young center. However, the needs of the center for additional staff and funding failed to win the support of the Congress. Rather, Congress sought to strengthen the center by changing it in 1974 to a statutory entity reporting directly to the Assistant Secretary for Education. With the establishment of a separate Department of Education in early 1980, the center became part of Office of Educational Research and Improvement and continued to report to an assistant secretary. In October 1985 yet another reorganization was carried out which, among other changes, resulted in the renaming of the National Center for Education Statistics--"henceforth it will be known as the 'Center for Statistics'"--and removed some of its information dissemination functions. As is always the case, some internal restructuring occurred, with appropriate name changes for the operating elements. A description of the organizational structure of the center, as of April 1986, is in Appendix A.

WHAT THE CENTER COLLECTS

Until the late 1960s the statistical programs of the center and its predecessors were restricted primarily to general purpose data--enrollments, staff, and finance in the elementary, secondary, and postsecondary schools. The past quarter century, however, has seen the demands for additional and different kinds of information, which has resulted both in the initiation of special studies designed to meet the specific needs of Congress and in the development of new and expanded data collection systems at all levels of education. For example, the elementary/secondary school program was enlarged and expanded to reflect the effects of preprimary education and of adult and noncollegiate postsecondary education, to provide data on libraries and, most importantly, to implement longitudinal studies to measure and report on the effects of cumulative student development and change. In addition, information on inputs (such as enrollments, number of schools, and funding) and process (such as expenditures and curricula) was supplemented to reflect the increased emphasis in outcome measures--what students learn, what they know, and what happens to them after they complete their formal education and training. During this period, the center also initiated a series of publications, established a fast response survey system to meet data needs for policy determination, became responsible for the National Assessment of Educational Progress (NAEP) and, overall, grew in program and importance. The center lost responsibility for NAEP later in the decade, but regained it in October 1985. The principal center programs at the time the panel's study was initiated are described briefly below.

Common Core of Data

The Common Core of Data (CCD) program currently is the primary source of basic statistical data about public elementary and secondary educational institutions. Much of the data is derived from administrative records maintained by the state education agencies (SEAs), which compile the data in the desired formats and transmit them to the center. The CCD consists of the following six separate parts.

Part I. The Public School Universe File. This annual census of SEAs provides information on all public elementary and secondary schools in operation during a school year. This file includes information on school type, grade span, fall

membership, and the number of classroom teachers. The school data are aggregated to the state level.

Part II. Local Education Agency (LEA) Universe File. This annual census of SEAs provides information for the universe of LEAs in a state on type of agency, operating status, fiscal status, and control status. The LEA data are aggregated to the state level.

Part III. Local Education Agency Nonfiscal Report. This annual census of SEAs provides data on LEAs on number of schools operated by the agency, membership, and full-time equivalent teachers and other staff. The LEA data are aggregated to the state level.

Part IV. Public School District Finance Report. This annual census of SEAs provides data on LEAs on average daily attendance, revenues by source, and expenditures by major function.

Part V. State Aggregate Nonfiscal Report. This annual census of SEAs provides data for states on fall membership by grade level, full-time-equivalent staff by major category, and high school graduates.

Part VI. State Aggregate Fiscal Report. This annual census of SEAs and other state agencies that provide resources to LEAs provides aggregate data for states on average daily attendance, school district revenues by source, and expenditures by major function.

Sample Surveys

In addition to the administrative data collected through the Common Core of Data, the center conducts sample surveys among education institutions to obtain other data on public and private elementary and secondary education to address emerging policy issues. Some of these surveys are done periodically; others are of a one-time nature. Some recent examples include:

Public School Survey. This survey of a nationally representative sample of both schools and teachers within the schools obtained core summary data and supplementary data on topics of policy interest. The core data collected from school administrators included: grade span, fall membership,

minority enrollment, full-time equivalent (FTE) teachers and other school staff, class size, and high school graduates. Data collected from teachers included: age, sex, and race; education and training; teaching assignments; time utilization; and compensation. The data from the surveys of schools and teachers were aggregated to the national level.

Private School Survey. This survey of a nationally representative sample of private elementary and secondary schools, supplemented by an area sample of schools, obtained core school summary data and supplementary data on topics of policy interest. The data collected on schools were, in general, parallel to data collected in the public school survey, but the survey also included data on school policies, program offerings, tuition rates, and participation in federal program. As in the public school survey, data were aggregated to the national level.

Survey of Teacher Demand and Shortage. This survey of a nationally representative sample of LEAs and private schools obtained data on the number of teachers by assignment, the number of new hires, the number of positions that ould not be filled, and recruiting and employment practices. The data from LEAs and private schools were aggregated to form national estimates.

National Assessment of Education Progress

The National Assessment of Educational Progress (NAEP) was mandated by Congress as a program to continuously monitor the knowledge, skills, and performance of the nation's children and youth. Begun in 1969, NAEP has each year conducted assessments of students at ages 9, 13, and 17 in ten school-related subject areas: reading, mathematics, writing, science, citizenship, social studies, art, music, literature, and career and occupational development. NAEP also conducts special assessments in other educational areas, such as young adult literacy, which is an assessment of the nature and extent of literacy among young adults aged 21-25.

Longitudinal Surveys

Beginning in 1972 the center initiated the first in a series of longitudinal studies, known as the National Longitudinal Study of the High School Class of 1972. The fifth follow-up

survey of this study was conducted in 1985. The second study, High School and Beyond, is a national longitudinal study of cohorts of 1980 high school sophomores and seniors, who are being interviewed over time to determine what happened to them after high school completion. Parents, teachers, and school administrators were also interviewed in connection with the study. Beginning in 1988, this survey will be complemented by the National Education Longitudinal Survey (NELS:88), which will begin with an eighth grade cohort. The major objectives of the longitudinal studies is to provide trend information about the quality, equality, and diversity of educational opportunity and the effect of these factors on individual development and educational and career outcomes; changes over time in educational and career outcomes; and transition rates for such changes as high school to college, two-year colleges to four-year colleges and universities, and school to work.

Higher Education General Information Survey

The Higher Education General Information Survey (HEGIS), begun in the mid-1960s, is a coordinated effort designed to acquire and maintain statistical data on the characteristics and operations of institutions of higher education. A series of surveys, HEGIS collects information from the universe of institutions of higher education on five subjects: institutional characteristics of colleges and universities; opening fall enrollment; salaries, tenure, and fringe benefits of full-time instructional faculty; degrees and other formal awards conferred; and financial statistics.

Concurrent with the conduct of HEGIS, the center was developing a new program, titled the Integrated Postsecondary Education Data System (IPEDS), which will replace HEGIS and provide a data base covering both traditional and nontraditional postsecondary institutions. A major rationale for the development of an integrated system is its improvement over some currently used surveys of postsecondary education that are recognized as having statistical deficiencies. As the panel's study was under way, forms and procedures had been established and a pilot study successfully completed. Plans call for this revised approach to be introduced to the postsecondary education community beginning in late 1986.

Vocational Education Data System

Mandated in 1976, the objective of the Vocational Education Data System (VEDS) program was to collect data on vocational education for purposes of policy analysis, program accountability, program evaluation, and manpower planning. The program did not meet the expectations, despite undergoing a number of revisions, and was terminated in December 1983. At the present time, the center is exploring a number of alternative means of collecting data on vocational education.

Other Data Collection Efforts

In addition to the sources described above, the center conducts ad hoc surveys, as needed, on subjects of immediate interest or obtains data under contractual agreements with SEAs, with private contractors, or with one of the federal statistical agencies.

It also must be borne in mind that the data collected by the center represents only a relatively small proportion of the data collected by the department, since program offices directly collect program and compliance data.

With the appointment of a new administrator in late 1984, the center initiated a thorough review of all of its data collection programs, addressing issues of suitability, scope, reliability, and timeliness of its products from the viewpoints of the variety of purposes to be served, including instructional, administrative, and policy. This endeavor is unique in that it incorporates direct public comment and participation by the education community (and by other interested parties) on all aspects of the center's programs, from objectives through data needs and from collection methodologies to output and product. The extent to which this approach is successful and is reflected in the future data-gathering and information-producing activities of the center cannot be assessed at this time, but the panel commends the center leadership for taking this step and for attempting to involve its community of interested and concerned users in the development of the model which will guide its program for the future.

THE CENTER--WHOM SHOULD IT SERVE?

With 120 years of tradition to call upon, the appropriateness of the federal government's role in the collection and provi-

sion of statistical information on education is no longer an issue. Recently, in fact, a report by the Heritage Foundation calling for the abolition of the Department of Education categorically exempted the collection of statistics (Butler et al., 1984). Nonetheless, there has been, and continues to be, ongoing and ofttimes strident debate, if not confusion, on the more fundamental issue, namely, the role of a center for education statistics: What is it? What should it be?

The arguments and disagreements are long standing and, like demons, appear and reappear in a variety of forms. Perhaps the broadest and most fundamental disagreement is expressed as the conflict between two philosophies: one that maintains the availability of wide and ready access to basic information is an important federal responsibility, and one that justifies federal data collection only as required to meet specific program needs. That this is not a new problem is borne out by reference to a management evaluation conducted by the Department of Health, Education and Welfare in 1978, which noted "confused opinions on what NCES' role is and should be in relation to the Education Division, the Office of the Secretary, and Congressional mandate . . ." The report went on to note: "this confusion . . . is a result of one major factor: the lack of an established role in the Department for NCES" (U.S. Department of Health, Education, and Welfare, 1978:13). This concern also was expressed by the Advisory Council on Education Statistics (ACES) in its second annual report, issued in 1977. The council expressed its concern in terms of the degree of autonomy and independence available to NCES, to "insure its products and activities have an actual and perceived non-political character" and stated, further, that its role in "collecting data for purposes of compliance enforcement, program evaluation or regulation . . . must not impair the effectiveness of the center as a general purpose statistical agency" (U.S. Department of Health, Education, and Welfare, 1977:6).

A clear view of the role of a federal statistical agency, in the panel's view, is found in remarks presented at the Census Bureau's first annual research conference in March 1985. In discussing the role of statistics in government decision making, the then Under Secretary for Economic Affairs of the Department of Commerce, Dr. Sidney L. Jones (1985), said:

> I believe that the mission of statistical agencies should be to fulfill their specific responsibilities within the overall information system, rather than responding to the ad hoc functional priorities of their parent institu-

> tions. . . . These two institutions (Census and the Bureau of Economic Analysis), along with others like the Bureau of Labor Statistics, the Bureau of Justice Statistics, the National Centers of Health and Education Statistics, and the Statistical Reporting Service of the Department of Agriculture, are all part of an information system whose principal responsibility is the integrity of the numbers, not responsiveness to political needs. That should be their number-one priority. The fact that they happen to be parts of . . . some [other] department is, to me, not the controlling fact of their missions.

The panel fully shares Dr. Jones' view. To restrict the center solely or mainly to the data requirements of those with program responsibility, in the panel's opinion, would be extremely shortsighted. It would result in a statistical organization stilted in scope, limited in flexibility, and viewed as a partisan arm of the department. And it would violate the history of and congressional intent for the center.

THE CENTER'S PROBLEMS

The center has experienced relatively little success over the years in obtaining support for funds, staff, or program initiatives from its department, from the Office of Management and Budget, or from Congress. This lack of support has contributed to the inability of the center to develop both the image and the reality of a competent and objective major statistical organization serving the wide need for statistics about education in the United States. The reason for persistent lack of support is not clear. One suggestion is that the highly decentralized nature of education has placed the gathering of statistics at the vortex of a continuing struggle, a tug-of-war, if you will, between the diverse players in the education field--local and state officials, associations and interest groups, the Congress, and groups with program responsibilities within the department--few of whom could or did agree on what should or could be collected, or how. A recent report by the Committee for Economic Development, *Investing in Our Children*, summarized the situation in these words: "Private industry could not succeed with a data-collection system and research base as weak as this nation has in the field of education" (quoted in *Anthropological Newsletter* 26(9), 1985).

Reports of prior advisory committees--in 1957, in 1960, and in 1963--and the report of an internal departmental study in 1978 all testify to the persistent problems that have plagued the center for many years. The most recent of these advisory committee reports on the state of educational statistics was explicit in their discussions of "persistent problems" (Advisory Panel on Education Statistics, 1963):

- o long delays in the completion of many studies and reports;
- o difficulties in the reporting of basic information by the initiating sources;
- o less than adequate understanding of the needs of users and anticipation of new needs;
- o failure to utilize fully and effectively modern methods of collecting and analyzing data, including sampling; and,
- o lack of adequate planning, organizing, and scheduling of the work.

It is somewhat sobering to contemplate the conclusion of the 1963 report of the Advisory Panel on Education Statistics, almost a quarter of a century ago, that "the indefinite continuance of these chronic problems is entirely unsatisfactory" (U.S. Department of Health, Education, and Welfare, 1963:3). It remains so today, as concluded by the department's own Advisory Council on Education Statistics, which initiated the work of this panel because of its own concerns, as well as by many others who had made their views known to the council. Another important conclusion to be drawn from this history is that, whatever the reason, the advice and counsel that have been sought and obtained appears to have been ignored and forgotten.

The most serious problems repeatedly cited to the panel concern the quality and lack of timeliness of the data produced by the center. These problems are widely known and have been openly expressed--in many of the more than 50 papers prepared in connection with the center's ongoing redesign of its elementary and secondary data system and, as we noted, by the center itself as a major rationale for the development of its revised system of postsecondary data collection.

Quality

The seriousness of this issue of quality is clearly illustrated by a quote from one of the redesign papers: "If the data continue to be as inaccurate in the future as they have in the past, all other issues are moot" (David, 1985:143). The poor quality of the data is generally attributed to the fact that the data are collected, in large part, from administrative records maintained at the local level, which record "official" rather than "real" behavior; that the data are the product of diverse record-keeping systems that lack comparability in definitions and time periods; that the data provided to the center are at such gross levels of aggregation--such as for a state as a whole--as to seriously limit anyone's ability to check them for accuracy, consistency, and reasonableness; and that the data as published are at such summary levels of geography--such as a region--as to seriously limit their analytical usefulness.

Our review found that, for the most part, the center lacks written standards to guide many, if not all, of its technical activities, including those concerned with collecting data, monitoring contracts, and publishing reports. Many of the problems the center has encountered also lead us to conclude that unwritten standards of performance either do not exist or are not known to the staff. Furthermore, the application of general statistical standards is highly variable throughout the organization and its products. In publications, for example, technical detail is often lacking, error statements do not provide the required information, table columns or rows may not add to totals, table titles are not descriptive of the content, and headlines are not borne out by the data. In reviewing the background of the publications, it is also clear that the comments of reviewers have not been taken into account.

The effort to collect data on vocational education, as mandated by Congress in 1976, illustrates virtually every problem encountered in our review. The history of the Vocational Education Data System (VEDS), from its inception to its termination in 1983, is marked with failed attempts by a wide range of interested and involved parties, including the center, other parts of the department, states, and Congress, to establish, agree on, and accomplish realistic goals. Furthermore, the congressional mandate for VEDS failed to provide either staff or financial resources for the new effort, nor did the department shift resources to assist the center; consequently, the center had to consume large amounts of its

scarce resources on VEDS, to the detriment of other ongoing programs.

Between fiscal 1978 and 1983, the center spent about $2.1 million on start-up costs for VEDS and an average of $600,000 per year in operating costs. The costs to the states--and thus the eventual loss--was manyfold greater; the center estimated that state and local start-up costs were between $10 and $35 million and that operating costs were at $15 to $20 million per year. As noted, however, despite this considerable expense and effort, VEDS failed to meet its goals: it collected the full scope of planned data requirements only once in its five-year life.

Furthermore, in late August 1983 the center notified the department that apparent problems had been identified in the data that had been collected and, in early 1984, the center confirmed its earlier statements and added that the VEDS data were unreliable and subject to serious misinterpretation. The center listed many reasons for the unreliability: lack of comparability among states, resulting in misleading national totals; year-to-year variability in the data, severely limiting the usefulness in trend analysis; within-state discrepancies, identified when data from VEDS were compared with data from independent sources; variability in collection methodology, reflecting poor management within states; a lack of uniform reporting, resulting from difficulty in applying uniform definitions; duplicated counts--in a study of nine states in 1981, duplicated enrollments ranged from 10 to 50 percent; changing universes, reflecting the changing composition of state plans; differential response rates, reflecting yearly variations in the number of reporting units; missing data--a number of states were unable to provide the detail requested, particularly for financial data.

In December 1983 the Office of Management and Budget disapproved the department's request for VEDS collection for 1983-84. The center had begun the process of revising the program in August 1983; the sixth revision was submitted in September 1984; as of August 1986, collection of data on vocational education had not been resumed. Given this chain of events, one can easily agree with the thought expressed by a former administrator that "VEDS is a four-letter word."

That the project failed is certainly unfortunate. Most damaging, though, was the high price exacted from the center--it bore the brunt from all sides, with substantial additional loss to its already fragile professional image and to its morale.

VEDS, however, is not the only center program with problems. Response rates in the collection of the Common

Core of Data components from elementary and secondary schools have been far below any acceptable standard, yet little if any concern appears to have been expressed or any action taken until very recently. At one of its early meetings, the panel was astonished to be told that it was usual practice to have received less than half of the responses from the states by the cutoff data specified by the center, that six or more additional months might elapse before most of the delinquent states complied, and that some states just failed to comply. In the case of the most recent group of CCD surveys (those for the 1983-84 school year or later), not a single one of the six component surveys was completed by the due date. And two months later, the same situation existed--not a single survey had achieved a 100 percent state return rate: three of the surveys were missing 10 percent of the replies, one was missing 15 percent, and the remaining two were still awaiting replies from one-fourth of the states. And one year after the due date, three of the surveys were still incomplete. The panel was further astonished to learn that no procedures, such as organized follow-up, existed for dealing with noncompliance. Rather, the center sent a series of advance notices of a forthcoming inquiry to the states. Techniques for improving response rates, of course, have been standard procedures among data collection organizations for many years.

In addition to lack of completeness, evaluation of results, investigations into possible sources of error, exposure to peer groups, record checks--standard operating procedures for statistical surveys--seem not to have been part and parcel of the center's operating philosophy, and their absence has contributed to the center's difficulties. The center's problems of data quality are further compounded by the lack of any specific individual or office with the assigned and explicit responsibility either for putting standards in place or seeing that they are carried out.

The center's publications can also be faulted with regard to quality and accuracy. For example, a bulletin issued in April 1982 (NCES 82.3116) presented the results of a survey to determine the labor market experiences of students who completed vocational education programs in 1979. The methodological description is both so brief and incomplete as to be of little value to users. The role of the individual states in the collection of the data is confused, as is that of the education components within the states; response rates as given do not distinguish clearly between those for states and those for completers (a term that is never defined), and response rates for those states using sampling are not shown.

The weighted total of replies (which is erroneously labeled as respondents) appears in the body of the bulletin, but the number is omitted from the methodological discussion. That discussion does note the failure of three states containing half of one universe to participate in the survey, but this fact, or an appropriate caveat, are not noted in the body of the bulletin. A proportion noted in the text differs considerably from that which appears in the appropriate table. Finally, the data are presented to the unit digit (e.g., 591,377), ascribing a wholly misleading and totally unwarranted degree of precision to the results.

In similar fashion, data on enrollment in vocational education by provider and state appears in Table 3.2 of the 1983 *Condition of Education.* In no fewer than nine states, the numbers of enrollees in vocational education in public secondary schools in 1979, as shown in this table, exceeded the total reported as enrolled in secondary schools, as shown in a table from another center publication, the 1979 *Digest of Education Statistics.* In yet another instance, review by an assistant secretary resulted in two pages of comments on a center report on nonresident alien enrollments in higher education, most of which addressed the issues of clarity, accuracy, consistency, and ease of presentation; the report previously had been reviewed fully and approved at all levels within the center.

The perception of the center is not helped when another part of the department openly criticizes a report issued by the center. In one case, the Office of Vocational and Adult Education (OVAE) challenged a report issued by the center in March 1983 and based on expenditure data collected through VEDS. The NCES Bulletin, which was headlined "State and Local Expenditures for Vocational Education Continue Steep Decline" (National Center for Education Statistics, 1983b), does in fact represent an unsatisfactory piece of statistical presentation that passed through the center's review process without major change or criticism at any level. Both the basic work and the review were clearly inadequate. The headline refers to declines in expenditures; the data in the report refer to changes in the ratios of state and local expenditures to federal expenditures--a very different matter. The report also suffered from sloppy and inconsistent presentation, such as rounding errors and switching between current and constant dollars. The reaction of OVAE to the *Bulletin*, however, missed most of the inconsistencies and instead focused on the differences between early and revised reports from states.

The controversy did contribute to the center's initiation of an evaluation of the VEDS data quality (though no thorough process of checking back to the states was ever carried out), to the institution of formalized review processes within the department for center products and, ultimately, to the demise of VEDS.

Of course, not all the center's work is bad, and the integrity of a statistical organization is seriously compromised when its advice, based on sound statistical procedures, is ignored. Such was the case when, in early 1984, at the urging of the American Association of University Professors (AAUP), the Secretary of Education directed the center, over the objections of both the center and the Assistant Secretary for Educational Research and Improvement, to provide AAUP with a tape that contained both incomplete and not fully edited data on salaries and tenure of staff in colleges and universities, collected as part of the Higher Education General Information Survey (HEGIS). Subsequently, an article in *The Chronicle of Higher Education* raised serious questions about the data and their release by the center. The final irony was the concern expressed at the top level when the center was subsequently accused of releasing the incomplete and incorrect files.

Timeliness

One of the major concerns expressed by users of the center's data, and reflected in the decision of ACES to seek this review, has been the lack of timeliness in the data. This lack, which has resulted in inordinate delays in the publication of important information, reflects a variety of causes. For example, poor planning or inadequate management of a survey process can result in an overly extended data collection period, as in the case of CCD as noted earlier; clerical processing and data production requirements can be underestimated; the complexity of activities can be ignored or not fully understood; time schedules can be allowed to slip; funds can be inadequate for the needs; and, finally, long delays can occur in the preparation of results for publication and in the process itself. The end result is that the data are less useful and users are frustrated. All of these factors have been present, either singly or together, in the center's efforts to produce its products. The result is that the most recent edition of the *Digest of Education Statistics*, published in December 1983, contains state-level data on student enrollment only through fall 1982, instructional staff data

only through fall 1981, and finance data only through the 1980-81 school year. As of August 1986, the latest published state-level data in each of these areas appears in the 1985 edition of *The Condition of Education* and refers to 1983-84 for school enrollments, 1981-82 for instructional staff, and 1982-83 for school revenues and expenditures. The 1986 edition of *The Condition of Education*, originally scheduled for publication in June 1986, is now promised by the end of the year.

The occasional bulletins issued by the center appear to have fared equally poorly. *A Directory of Computer Tapes* took six months to complete internal center review, following which an outside reviewer still found numerous problems in the publication. And, unfortunately, the time period between collection and publication remains long--one bulletin reporting on data for 1982 was still in review in early 1985.

Conceptual Obsolescence

Another issue to be dealt with in the field of education statistics is that of conceptual obsolescence. As pointed out by Bonnen (1977), two types of conceptual obsolescence occur in data: one, because of changes in the organization and framework of that which is being studied, in this case, the education system, and one, because of the changes in the demands on the system. Changing the design of data or its collection system--which the center is now attempting through its different redesign efforts--invariably involves a conflict between those who strongly favor the status quo in order to maintain comparability over time and those whose needs will best be met by the proposed changes. Resolution of conceptual issues is neither simple nor immediate. On the other hand, according to Bonnen (1977:399): "Failure to keep up with the changes in the policy agenda and in the reality of (education) leads to significant conceptual obsolescence, and the system begins to lose its capacity as an accurate guide for problem identification and solution or management." That this has been one of the concerns expressed about the center is borne out by the total of 59 articles, letters, and comments covering 785 printed pages and containing hundreds of recommendations from more than 50 experts, organizations, and agencies that the center received in response to a broad, public request to the education community to comment on the proposed elementary/secondary redesign program and to suggest ideas for improving the nation's store of data for education policy.

Finally, the center has long faced serious questions about its professionalism, staff competence, and management abilities. The management evaluation referred to earlier (U.S. Department of Health, Education, and Welfare, 1978), for example, listed ten problems, varying from a lack of response on the part of the center to policy needs, dissatisfaction with the timeliness of the products, general lack of responsiveness on the part of NCES to special requests or to users, to disagreement over the nature and extent of data analysis to be performed.

In its response to the 1978 internal management review, the center noted two major problems that it believed were the cause of all other problems--funding and staff resources that were much lower than those of other statistical agencies. Whether the sole cause or not, what was true in 1978 is equally so today: the center continues to be the smallest of the five primary federal statistical agencies in both dollars and staff. In fiscal 1985, its budget stood at $14.2 million with 134 authorized positions. In contrast, the National Center for Health Statistics, which, until the establishment of the Department of Education in 1980 was a sister statistical agency in the same department, had a budget of $42.8 million and 493 authorized positions. Both the center's budget (adjusted for inflation) and its staffing level have decreased more than 25 percent since fiscal 1978; other federal agencies primarily involved in statistical activities were cut by less than 10 percent (Congressional Research Service, 1984). Whatever the reason for this treatment, it is quite clear that the center and its products have been seriously affected.

The low level of funding for education statistics becomes even more startling when examined against the pattern of total expenditures for education. Comparing education and health, both highly decentralized program areas, we find that total government expenditures (including federal, state, and local) are at similar levels, on the order of $150 billion per year for health against $180 billion for education (Bureau of Economic Affairs, 1984:Tables 3.15-3.17). But expenditures for federal statistical programs show enormous disparity: obligations for health statistics are estimated to be $176.5 million; for fiscal 1986, those for education statistics are estimated to be $18.9 million (U.S. Office of Management and Budget, 1985). In relative terms, then, the ratio of total government health expenditures to education expenditures is close to 1 to 1, while the ratio of expenditures on health

statistics to those on education statistics is more than 9 to 1.

This extreme difference certainly raises some questions about the understanding of the need for and the commitment to high-quality education statistics, especially in light of the current public concern about educational quality. To cite another example, several years ago when the energy crisis was a major public issue, more than $100 million was provided to the Energy Information Administration (EIA) to remedy the lack of energy statistics. Even in today's restrictive budget climate, the EIA budget for fiscal 1986 is approximately $60 million, or more than four times that for education statistics. It seems clear that, whatever the reason, the center has been seriously underfinanced.

It would be quite simple if all the difficulties of the center could be blamed only on a lack of money. Unfortunately, as we have shown, the situation is otherwise. The center continues to face three more basic problems:

- it lacks a clearly defined mission and role supported by agency leadership;

- there is no agreement on an explicit framework as to what data should be collected and how they should be obtained or on the establishment of priorities within available choices to ensure that the center is successful in carrying out its mission; and

- it lacks the technical capability and resources to do its job.

The panel's reactions to the first two problems are addressed in Chapter 2; the last concern is dealt with in Chapter 3.

2

Mission, Role, and Frame of Reference

A continuing thread throughout the panel's review has been the consistent lack of support for the center or, expressed another way, its seeming isolation from participation and involvement at the policy-making levels of the department. Although not a solution in itself, the center will benefit through having its role detailed more clearly in its mandated charter and, in turn, Congress and the Secretary of Education can and must contribute to the growth of the center as a respected, impartial voice on the condition of education in the United States. To this end, our initial recommendations in this chapter deal with the role, mission, and responsibilities of the center; the second set of recommendations concern data collection strategy and, in a general way, data substance; our final recommendations concern the center's frame of reference.

The panel's recommendations establish a role for the center and recognize its importance in reaching out to policy makers and to its user community and involving them in dialogue on data needs. The center's recent efforts in this regard in connection with the redesign of the elementary/secondary data collection system are to be applauded, but this process must become an inherent part of the center's activities and not an occasional activity resulting from the concerns and thus the pressures of concerned data users. In this connection, we provide some general guidance in terms of needed program content and program direction that departs from the state-oriented collection of administrative data and points to the need for sample-based national data that are essential for understanding the functioning of the nation's educational system.

It is essential that support for the center and its independence be clearly articulated by both Congress and the relevant departmental officials and that the appropriate actions be taken to demonstrate the full extent of the support. History shows that the center has seldom, if ever, shared its knowledge and expertise, even in the determination of its resource needs, either with the Office of Management and Budget or with the appropriations subcommittees of Congress; the center invariably has been represented by other entities. Thus, its needs and their justification have been presented by others, not the optimum way for the center to gain respect and credibility. In the panel's view, the department must provide the center with the opportunities to be seen and to be heard, to have the opportunity to respond directly and openly to challenges and to criticism, to be held responsible for what it says and what it does, to understand through direct colloquy what is expected of it, and to understand why and how its requests have been disposed of. It is also essential that the center be viewed as objective, unbiased, and nonpartisan in carrying out its mission.

Even beyond support, the center requires recognition of its role in participating in the determination of data needs and of its capabilities in determining if and how the needs can best be met. Furthermore, the center must be recognized as the key source for compiling and issuing data, including the release of key indicators and especially for assessing progress in education among the states. Given the history of the center, the panel believes that its position would be strengthened by broadening and detailing its mandate and by positive actions on the part of Congress. We propose several first essential steps in the process of refocusing the center.

- The panel recommends that the mission of the Center for Statistics, as stated in Section 406(b) of the General Education Provisions Act, as amended (20 U.S.C. 1221e-1), be strengthened to clearly establish and define the role of the center in assisting the Secretary of Education in determining the data needs for assessing the condition of education in the United States, and for accepting responsibility and accountbility for ensuring the availability of the necessary data.

- The panel recommends that Congress demonstrate its support for the center and its mission through its budget actions, through its requests for informed statistical advice, through requests for direct testimony from center officials, and through its calls for education data.

- The panel recommends that the Secretary of Education demonstrate strong and continued support for the center and its mission through department budget requests, public statements, and in appearances before Congress.

- The panel recommends that Congress and the secretary recognize and state their support both for the nonpartisan nature of the center and for its statistical independence.

- The panel recommends that the secretary designate the center as the functional agency responsible for coordination and technical review of all data collection within the department.

- The panel recommends that the secretary designate the center as the focal point of releasing statistical information on education.

- The panel recommends that the center assume accountability for the process that leads to the determination of the content of the data to be collected.

CONTENT AND DIRECTION OF DATA COLLECTION PROGRAMS

Given the ongoing debate on education, it is quite clear that the center needs to make substantive changes in programs and in overall strategy. We believe the following recommendations are both basic and essential to providing the underpinning for the more difficult steps to follow.

- The panel recommends that the leadership of the center develop mechanisms to assist policy makers in determining their data needs and that the center continue to involve its users in dialogue to determine the most relevant and appropriate content of its data collection efforts.

- The panel recommends that the center continue the compilation of program, staff, and financial data from the states, but that it undertake an analysis, jointly with representatives from the states, to ensure that the present program meets both center and state requirements for usefulness, relevance, quality, and reliability. In addition, the content of the data on the condition of education, originating with the states, should be monitored periodically with the intent of improving the content and thus its usefulness to the center and the states.

- The panel recommends that the center initiate a sample-based program of data collection focused on individual classrooms and students, designed to facilitate better understanding of the relationships between educational inputs, processes, and outcomes. The sample would not necessarily be able to provide adequate estimates for all individual states, although it should be organized so that states could choose to augment the sample to provide state data.

- The panel recommends that sample-based data on educational inputs, processes, and outcomes be made readily available, on a timely basis, to all interested users in the form of public-use tapes, with appropriate masking of characteristics to preclude the identification of individual schools, teachers, or students. The panel believes that the usefulness of center data would be greatly enhanced if its data become widely available as a resource for both policy and research use.

- The panel recommends that the center continue to explore the inclusion of longitudinal features in its sample-based survey data and that, as a minimum, small-scale longitudinal studies be mounted regularly as part of the center's data collection efforts.

ESTABLISHING A FRAME OF REFERENCE

Every organization in carrying out its mission and role operates within a set of guidelines, a frame of reference against which it measures and weighs what it should be doing, what it is doing, and, finally, how well its completed tasks meet its criteria. In many cases, the framework is fully articulated and spelled out in directives or other pronouncements

of the organization; in other instances, the history of performance stands as the object illustration, and little if anything is found in written, explicit form. The center appears to fall very loosely into the latter group--the panel was unable to find a clearly defined conceptual framework that has served as the guide for the center. In fact, we would argue that the history of the center suggests that it has operated primarily in a reactive mode, facing each problem or challenge somewhat independent of the one before, and that its framework or operating model has neither been documented nor is readily discernible through observation or from conversation with staff.

- o The panel recommends that the center develop a conceptual framework for organizing its program and for setting priorities in light of available resources.

Such a step will provide a basis for planning and a basis for review and evaluation of problems. This section presents the panel's views on some aspects of a framework and some desirable characteristics of a data collection system.

A Model for Data Gathering

A model for the center's data collection activities should be characterized by its ability to meet two major objectives that the panel sees as essential to a system of educational statistics. First, almost all of the data collected by an educational statistics agency should reflect the interplay of educational inputs, educational resources, and educational outcomes. Longitudinal data are required to trace the influence of resources applied at one point in time to outcomes observed at a subsequent point in time. Second, a data collection system must be guided by the needs of users and reflect the joint concerns of both the research community and the policy community.

The role of the research community is to ensure the collection and reporting of data most relevant to analysis of educational processes and outcomes. The involvement of the research community also contributes to the continuing evaluation of the adequacy of the data, both in coverage and in statistical quality. The policy community sets the agenda for data collection and thus establishes the needs for data relevant to policy decisions (even if, at that time, the data have no well-defined role in an existing model).

The center's data collection efforts should comprise elements that can be classified along several dimensions, such as serving primarily analytic uses, in which they form an essential element in an analytic model of the educational process, or as serving primarily descriptive uses, in which they inform users about the size or distribution of a particular characteristic of the educational system. Data elements can describe micro-environments, such as activities in a particular school or classroom, or they can describe macro-environments, such as all schools or classrooms along a particular dimension. Data can be cross-sectional, such as describing the state of a particular education variable at a specific time, or longitudinal, describing a process of change that takes place over a given time period. Finally, data can relate to any of five levels of the educational system--preschool, primary or elementary school, secondary school, postsecondary school, and education at work.

As we have noted earlier, a data system must be perceived as an evolving collection of measures in which design of the system not only reflects existing or past interests and needs of the education community, but also attempts to anticipate future interests. As understanding of relationships among inputs, processes, and outcomes changes with new research knowledge, and as policy needs change, measures of central importance at one stage of development of a system are likely to be replaced by other measures.

This process of change will be enhanced if opportunities for analyzing the data are regularly made available to outside users as well as to center staff. The quality and utility of data are tested through the close scrutiny of data analysts and researchers trying to understand the effectiveness of the educational system or the relationships between inputs and outputs or the mechanism by which various system inputs are generated. In similar fashion, use of data by policy makers and the public serves as a test of both quality and utility.

Implementing a Framework

Fulfilling the center's mission--to collect and disseminate statistics and other information related to education in the United States and other nations and to design a system of statistics that not only satisfies current information needs but also anticipates the future information needs--requires that the center improve its approach toward setting priorities and allocating resources. In so doing, it must make clear how what it collects augments information available on edu-

cation in the United States from other sources and how, collectively, the available information fits within a structure that also makes clear what information is not being collected.

One might begin this process by exploring the issue of the outcomes of education. For example, answers might be sought to such questions as the extent to which students learned what they were taught; the extent to which students were prepared for the next steps--further education or work; and the extent to which students have accumulated skills that permit them to function as adults. Currently, criticism is heaped on the meager data currently available on student outcomes, whether they be achievement rates, reading accomplishment, dropout measures, or conclusions on labor-market transition success--all are considered inadequate. Taking the lead in identifying and seeking agreement on appropriate outcome measures and devoting imaginative and innovative thinking to possible data collection programs would certainly be a forward-looking and much-needed step for the center.

Ideally, the center should provide information that allows examination of the differences among students and school systems and other potential influences on outcomes. These influences include the available resources--funding, qualifications of teachers and administrators, curriculum quality, characteristics of the setting in which education takes place (e.g., policies, organizational structure, physical facilities), and context--characteristics of the students and their families, (e.g., cognitive and social skills, and public attitudes.) For each potential influence, the statistics system must try to describe the parameters of the potential influences (e.g., the knowledge, skills, and dispositions of teachers) as well as to model the origins of those characteristics (e.g., studies of teacher education, recruitment, and selection). Because each of these influences is complex and represents a cost, the center must be responsible for establishing the priorities to determine the area to be explored and developed, for determining the information to be collected, and for providing the logic behind the choices. Although this brief discussion of educational outcomes and of potential influences is written largely from the perspective of describing the education that is provided in schools and colleges, the general framework also applies to preschool education, both formal and informal, and to education provided in the work environment. Ideally, a system of educational statistics would also be capable of describing transitions from education at one level to education in another. Key points of transition are from preschool to elementary school, from elementary school to middle school, from middle school to high school, from high school

to postsecondary education or to work, and from postsecondary education to work. These points of transition raise questions concerning how well the educational outcomes from one level serve as appropriate inputs for productive educational experiences in another level. They also raise questions about the continuity of learning experiences and the effects of continuity or discontinuity on educational outcomes.

Because the mandate for education in the United States is broad, because the U.S. educational system is complex, and because the influences on educational outcomes are so little understood, an ideal system of education statistics goes well beyond the resources now available to the center. It is especially important, therefore, that the center design and maintain its system of education statistics in a public and open forum, giving full access to users, policy makers, and researchers. The center is to be commended for having recently moved in this direction by involving a wide variety of constituencies in assessing the nature of its current work and in soliciting suggestions for future work. At the same time, it must be recognized that a system of education statistics that supports descriptions of trends over time is absolutely essential. Thus, responsiveness to current needs must be tempered with the requirement that a core set of data be maintained over time.

3

Designing a Program

Given our view that the Center for Statistics requires a fundamental change in its methods of operation, we stress once again the need to view our recommendations as a unified program. It is true, particularly in the areas covered in this chapter, that individual recommendations address what appear to be unique problems, but we believe the necessary and desired transformation of the center will occur only if all of the panel's recommendations are considered as a whole. The appropriate analogy is that of a complex machine that has many interdependent parts: fixing what appears to be one deficient part does not result in a workable machine; furthermore, fixing or replacing parts one at a time is both inefficient and counterproductive, since action (or its lack) in one area directly affects the progress in others.

Although we recognize that some additional funding will be required to fully implement our recommendations, we have not proposed a solution that rests solely on immediate, large infusions into the center. In the short run, the center will require modest additional support for the staff needed just to carry out its present program; however, we believe it unreasonable (as well as unwise) for the center either to request or to expect further support in order to accomplish the panel's recommendations without first having demonstrated a commitment and a strong beginning towards improvement. Although difficult choices may be required of the center, it is our view that much can be done within its existing budget and staffing level.

To this end, as needed, the panel strongly urges that the center plan and be prepared to divert resources or curtail existing programs or their scope in order to implement and accomplish the panel's recommendations. Given the wide range of possible actions and choices before the center, the panel does not believe it is the appropriate body to suggest

either the specific programs to be curtailed or which resources might be diverted; rather the panel emphasizes the need for the center to develop a mechanism to ensure that priorities and choices are openly discussed and chosen and made known to users and other interested parties.

This chapter is concerned with the realities of carrying out the program of the Center for Statistics. We begin by reviewing the role of the Advisory Council on Education Statistics, and then provide guidelines and recommendations for improving each of the areas involved in the production of data, including staffing and budget, quality control, design, collection, processing, and publication.

THE ADVISORY COUNCIL

The Advisory Council on Education Statistics was established by statute in 1974, and the initial members were appointed in mid-1975. It meets a minimum of four times a year, and its members serve three-year terms. The Assistant Secretary for Educational Research and Improvement serves as the presiding officer. In that the ACES charter directs it to "review general policies for the operation of the Center," it follows the practice of virtually all advisory groups--namely, to advise. What distinguishes ACES and sets it somewhat apart from other groups is the part of its charter that states that the Council ". . . shall be responsible for establishing standards to insure that statistics and analyses disseminated by the center are of high quality and are not subject to political influence."

The usefulness of any advisory group, of course, is dependent on a number of different factors, including the stature of its members and the extent of their competence in the topics under review; the types of information provided the group, the problems brought to it, and the cooperation it receives; the interest, concern, and responsiveness of those to whom the group provides its advice and counsel; and the degree of understanding and reaction on the part of the top management in the activities and actions of the group. Overriding these factors, of course, is the fact that any such group has neither operating nor policy authority.

The panel's review reveals that ACES has had a checkered past. In its early incarnation, its members indeed were technically oriented and extremely competent to review operating policies and comment on how the center carried out its mission. Later, the membership changed to reflect a broad variety of experience, but not in the collection of education

data or in topics necessarily related to the concerns of the center. As such, ACES appears to have become considerably less relevant and useful to the center over time. Moreover, ACES does not appear to have received any reaction to the concerns that it has raised in its reports to the secretary or to the Congress. Furthermore, for a variety of reasons, including the budget problems already noted, there appears to have been little or no reaction on the part of the center itself to the concerns raised by ACES. This lack of interest also appears to be fostered by having an assistant secretary, rather than the administrator of the center, sit as the presiding officer.

With regard to the mandate to establish standards, ACES, in its first annual report prepared in March 1976, expressed its support for the addition of a senior mathematical statistician to the staff and indicated it would return to discussion of the issue at future meetings. Successive reports dealt with one or another aspect of this issue and, as noted earlier, it was ACES that initiated the present study because of many concerns, including its perception of the continuing lack of standards within the center. As the panel was completing this report in mid-1986, it is informative to note that for the previous year or so the center had been seeking (but had not yet found) a principal statistician to assume responsibility, among other areas, for "the setting of standards and developing ways to ensure they are known and observed systematically in the Center" (letter from the director of the center).

With a goal of once again ensuring the presence of a range of technical competence, the present leadership of the department replaced the membership of ACES. It is obvious that if ACES is to be of any value to the center, it must consistently represent technical competence, both operational and substantive, and the panel urges that this be the key criterion for member selection. Nevertheless, it is the view of the panel that ACES alone cannot provide the wide range of technical advice that the center seeks and requires. Furthermore, we strongly believe that it is wholly inappropriate for ACES to be held responsible for establishing standards, a mandate that it never was able to implement. As we noted earlier, an advisory group can advise and provide an oversight function, but given ACES's lack of authority and intermittent operation with no staff, it should not be expected to establish standards. Responsibility for establishing and implementing standards--and ensuring that its products are of high quality and not subject to political influ-

ence--must and can only be the inherent responsibility of an operating entity, in this case, the center.

- The panel recommends that Congress modify the mandate of the Advisory Council on Education Statistics to a role of technical review and oversight, rather than responsibility for the establishing of statistical standards.

- The panel recommends that the Secretary of Education, in support of the center, provide timely written response to the concerns raised by ACES in its annual reports to the secretary, and that Congress periodically hold hearings at which both the secretary and representatives of ACES provide testimony on the status, problems, and progress of the center and the concerns and advice of ACES.

- The panel recommends that members of ACES be selected for their expertise and competence in areas directly related to the center's program.

- The panel recommends that the center establish one or more technical advisory groups, in addition to ACES, to meet at least twice per year to review, comment, and advise on the methodology used in the conduct of its work, and to provide the director with objective, outside, independent review of the technical capability of the center's staff or of its products. As required by its changing program needs, the center also should establish ad hoc advisory groups representing unique technical and subject area skills.

IMPROVING DATA QUALITY

Statistical Standards

The essential underpinning of data quality is the establishment and implementation of standards. Standards are the norms of the research community as to what constitutes adequate practice, and they provide mechanisms for the public exposure and censure of deficient practice. As noted earlier, ACES, by law, has the responsibility for establishing the standards which both guide the center's work and ensure that its products are free from political influence. In fact, this responsibility can only be carried out by the center.

Our earlier exposition of the many different problems faced by the center also serves to detail what the center must do to improve the quality of its data and its products. With regard to standards, we note that they have relevance and meaning only when they are required and expected of staff as a normal part of any task. Staff must understand the need for standards and must be technically competent in implementing them. Data quality is the product of commitment, competence, and pride. The center should not--cannot--accept less from its staff. It should also interact with those who provide its data to ensure that they, in turn, understand what is required of them and why, and it should assist the states and local school districts in carrying out their functions in a satisfactory and timely manner.

The panel notes that certain of the center's programs--for example, the longitudinal studies--are currently recognized by users as providing high-quality, valuable, and much-needed data. In some cases, the products have been prepared by staff; in other cases, the center has been very successful in and is benefiting from the selection of contractors whose reputation, operating philosophy, and accomplishments clearly demonstrate high standards. Simply put, the center urgently requires more of each.

- The panel recommends that the center develop, publish, disseminate, and implement standards to guide the conduct of all phases of its work, from development of objectives through collection, follow-up, and processing and including the preparation, review, analysis, and publication of results.

- The panel recommends that the center establish an Office of Statistical Standards and Methods and move expeditiously to recruit and appoint a chief statistician at the level of assistant director, with responsibility for the establishment and maintenance of statistical standards throughout the center.

- The panel recommends that the center, in concert with appropriate state and local education agencies (LEAs) and representatives of institutions of higher education, institute the development and publication of uniform definitions and their continuing review, to ensure the collection of consistent data, such as between different LEAs and states. Such information should be made available regularly in reference handbooks.

- The panel recommends that the center undertake a continuing program of evaluation of its methodology and its programs.

- The panel recommends that the center disseminate widely the results of its methodological research. Publications in professional journals and presentations at conferences should be strongly encouraged.

- The panel recommends that the center require that its reports contain information on definitions used in studies and a description of the data collection methodology, provide a measure of reliability, if applicable, and discuss possible sources of error.

Redesign of the Elementary/Secondary Data Program: An Example

Quality is a goal of all statistical organizations; recognizing and measuring it are the tools by which the goal is accomplished. The approach is called quite simply "quality control," and error is the villain. The many possible sources of error in statistical data and what can be done to expose, measure, and control them are well known and expounded on in textbooks on quality assurance. It is important to recognize that errors can arise from many sources at every stage in the collection, processing, and analysis of data and, furthermore, that some error is unavoidable (such as sampling error when conducting a sample survey, or recording error when using administrative records as the source of data). When designing a system to provide statistical data, all the potential errors need to be considered as well as the costs involved in reducing them.

The current effort to redesign the elementary/secondary data system provides a clear example of how these and many other issues surface and must be dealt with when fundamental changes are proposed. For example, should the common core of data be collected as at present--that is, through a complete enumeration of all school districts using, for the most part, administrative records--or should the data or some variant be obtained through a sample survey approach? On one hand, a sample survey approach--in which a sample of LEAs would provide a sample of schools and, in turn, a sample of pupils, teachers, and officials in these same schools--as proposed to the center by a panel of consultants (Hall et al., 1985)--is seen as providing more timely and more accu-

rate data. Proponents argue that it would permit greater control of the entire data collection process, provide for analyses of relationships within and across major areas of the education system, and result in reduced burden on respondents and that such a system also would provide longitudinal capabilities to relate outcomes to earlier experiences. Even this minimal list of potential benefits seems to lead to an obvious conclusion. On the other hand, the costs of implementing such a system would be great. Critics note that the basis for assuming the data would be either more timely or accurate is not firmly established and that the problems of integrating or linking the diverse elements would be many and difficult.

Although the current system raises serious concerns about the presence of large response and other types of nonsampling errors, the Common Core of Data program is institutionalized and has been in operation for a number of years. It has been adapted by the individual states to provide for many of their continuing needs for data, as well as being financially supported virtually in full by the states. In the words of the National Education Association (1985:738):

> The Core represents the most basic data series within the NCES. It enables assessments of what was, what is, and what will be in a statistical sense. Annual updates to Core surveys provide basic statistical information on public schools, their pupils, personnel, and finances . . . the Common Core may represent the most heavily used series of public school statistics. The Core is the cornerstone of educational information in the United States. No other public or private institution collects and maintains public education data to the extent that NCES does via the Core.

The choice of design also is often complicated by the multipurpose nature of statistical data--the preferred design for one purpose may not suit the needs of another. Thus, were all other factors equal, collecting common core data on a sample basis with controlled data collection almost certainly would be the preferred method for national and regional estimates; however, this method may not adequately serve the need for local area estimates. And if local school officials are unwilling to support the desired approach, that fact may outweigh all other factors.

On balance, however, the panel favors and supports a move to collect elementary and secondary data through a survey-based approach as a long-range strategy. Our under-

standing of the present character of the center's relationship with its data suppliers and the center's limited experience in carrying out such a survey lead us to conclude that abrupt and wholesale replacement of the existing system would entail an unwise and unnecessary risk. The center must not make the mistake of moving precipitously without undertaking the necessary testing and development, without first demonstrating to the states and local areas, as well as to itself, how it will deal with the issues that have been raised, what the costs of the program will be, and how and why a survey approach will produce consistent, accurate, and reliable data. The center also has a responsibility to the states to ensure that there is agreement on what their respective responsibilities will be under the new program and how the unique needs of different states will be met and supported. Thus, the panel supports serious study, development, and testing of an integrated system based on sample surveys, but urges caution, judgment, open discussion, and continuous review with all parties prior to the adoption of a new system. Above all, it urges that there be adequate testing to confirm the feasibility, probable cost, and the center's ability to accomplish the objectives of the program. In fact, the center may wish to overlap some survey-based components with the present CCD program as a learning experience, to demonstrate its feasibility, and to provide comparative data.

- The panel recommends that the center continue to explore most carefully the appropriate balance between the continuing use of state and local administrative record sources and the use of sample surveys. Although supportive of the use of sample surveys, the panel does not believe that the center has fully resolved the issues involved in shifting the elementary/secondary data collection system from one based on administrative records to one based solely on an integrated sampling survey approach. The panel endorses the efforts of the center in seeking new approaches to accomplishing its mission and suggests that small-scale testing within one or a few states be undertaken to establish procedures, define problems and develop solutions, refine the approach and, overall, assess the feasibility and cost of the survey proposal.

Detecting and Reducing Error

Another major reason for needing information on the magnitude of errors from different sources is in order to be able to provide data users with an assessment of the quality of the statistics produced. Sophisticated users will demand information on quality, but unsophisticated users may not. However, even without specific demands, the center has the responsibility not only to produce education statistics but also to inform its data users of the limitations of those statistics.

- The panel recommends that the center routinely make its users aware of the quality of the data and the limitations inherent in their use.

The nature of error, its many sources, and its measurement need to be understood as a proper basis for decision making with regard to the best way to collect, process, and publish data. It is only realistic to accept the inevitability of some error; at the same time, much of the error in a data collection process can be reduced by an effective and willing statistical agency.

The fundamental requirements, of course, are a general inquisitiveness on the part of the staff toward the entire process and toward the numbers collected, a distrust of the information conveyed by a sequence of digits, and an ever-present realization of the ease with which error can be introduced in data. Together, these factors combine to create an atmosphere in which efforts to minimize error become basic to the planning and execution of the data collection process and, later, in which the data as collected are examined for error and appropriate actions taken.

There are a variety of opportunities to exercise an error detection and correction process. The use of appropriate control procedures provides the ability to monitor the operation on a timely basis: sample checks made throughout the data collection process ensure that the operations are being conducted as specified; internal consistency checks are done when the data are obtained; for data that are collected periodically from the same units (e.g., schools or universities), present and past responses are compared to identify anomalies. Similarly, independent checks against record sources serve as a valuable quality control measure. Reviews by subject-matter specialists point out analyses that compare statistics that are not directly comparable, noting the need for additional variables in regression models.

All of these quality control measures, if they are to be successful, require that they be fully documented--both the procedures and the results must be available on a timely basis during the process. In addition, historical records must be maintained and readily available to guide in the planning for new projects with similar characteristics, to assess the effectiveness and efficiency of the quality control mechanism over time, as a teaching device, to correct faulty memories and, above all, to be exposed to critics and supporters alike, for comment and suggestion.

Particular care is needed in checking final estimates prior to publication. Errors made in the analysis and in the preparation of estimates for publication are potentially the most damaging. Results can be compared with those produced from other sources to see whether they are reasonably consistent; if not, an explanation of the discrepancy can be sought. Checks on data that are part of a time series can be made by examining the reasonableness of the changes that have occurred since the previous data collection. Errors also are less likely to be introduced into a publication if those responsible for its preparation are knowledgeable about its subject matter and thus able to assess the reasonableness of the data as they complete the analyses. At the most basic level, users expect that published data have been checked to ensure that detail adds to totals; that figures found in the text are those in the tables; that table titles reflect table content; and that highlights reflect the data. The panel has reviewed a number of examples of center publications that fail to meet these criteria and finds such performance by a statistical agency to be unacceptable. We believe that the Center for Statistics has a responsibility to ensure that its reports are a model of statistical integrity--complete, correct, and consistent.

Our recommendations deal in part with this lack of sensitivity to the ubiquitousness of error and the responsibility of a statistical agency and its staff to track down, diagnose, and correct as much of this error as possible before dissemination.

The usefulness of the publications produced by a statistical agency also is affected by the success of the staff in diagnosing and identifying the sources of error, as well as in measuring the amount of error that cannot be corrected. Interaction with data users helps focus error detection efforts on the areas that will benefit users the most. The openness and frequency of interaction of a statistical agency with its data providers helps to promote the establishment of standardized definitions and data collection procedures among

the providers. Thus, the relationships of the center with its communities of data providers and data users become an important and essential element in the achievement of quality.

- The panel recommends that the center foster a climate of openness in dealing with all elements of its constituency, including other parts of the department, other government agencies, Congress, providers and users of its data, and its professional peer groups.

- The panel recommends that the center initiate a comprehensive program to assess and improve, where necessary, the quality, consistency, and reliability of data obtained from state and local agencies, from institutions of higher education, and from other sources. Meetings, discussions, visits, and technical assistance, including the training of local and state officials on what is required of them and their systems, must comprise a major component of the program.

- The panel recommends that the center establish standards for review of data releases and institute procedures to effect them.

TIMELINESS

It is essential that any system of collecting education data recognize, reflect, and react to the issue of timeliness. Timeliness has two dimensions: collecting timely data and providing results in a timely fashion. Analysis becomes virtually useless if long-term gaps are allowed between collection points, particularly for topics that may show large directional shifts in relatively short time frames. Even more important, failure to anticipate or recognize a shift in emphasis or need inevitably results in a lack of timely and relevant information when the policy agenda takes one of its many turns.

An example of such a lack is the case of teaching and teachers. With the publication of *A Nation at Risk* (National Commission on Excellence in Education, 1983), these topics emerged as fundamental issues of concern, and the need for data was sudden and immediate. Unfortunately, information on the number of teachers and other professional staff--which we would think would be an essential element of any continuing data system--was last collected at the elementary

and secondary level in 1979-80. Data on minority teachers is even more archaic, having last been collected in 1968. At the postsecondary level, the most recent data are for 1976, hardly informative or useful for the concerns of the late 1980s. Turnover rates among teachers provide yet another example, having last been collected in 1969.

Although hindsight is certainly easier than foresight, these examples clearly illustrate several key facts. First, had the center's planning and decision process been guided by an organizing framework that required a balanced approach across and description of the phases of education--inputs, processes, and outcomes--at least minimum information on teachers and teaching would have been anticipated and available as a regular component of the center's data collection program. Second, an appropriate system of education statistics must strive to anticipate the needs, both of researchers and the policy community. Finally, it is important that the periodicity of data being collected be reviewed regularly to ensure that trends are being monitored on an appropriate time continuum.

Of the need to provide data in a more timely fashion, there can be no argument. Too often, the center has found itself embarrassed by an excessive and unacceptable time lag between collection and release of data. Perhaps there is no better example than the 1985 *Condition of Education* (National Center for Education Statistics, 1986), which states its objective as providing "accurate and timely statistics" and "the center's major response to its continuing mandate . . . to report full and complete statistics." But the vast majority of the data presented in this report are for 1983 or earlier, and in many cases the 1983 data are marked as "preliminary" or "projected." As to the references to "accurate" and "full and complete," one needs only to note again the examples in Chapter 1 or to refer to the *Synthesis of Invited Papers on the Elementary/Secondary Education Data Redesign Project* (Silverman and Taeuber, 1985c). Some of the concerns were highlighted in an article by Jonathan Friendly in the New York *Times* of March 11, 1986: "Last summer, for example, researchers asking the center for state-by-state totals on school enrollment had to make do with 1983 figures. But they were luckier than the people who needed statistics on teacher training and salaries: the center's most recent numbers for that dated to 1980 and 1981, before most of the state measures to improve education were enacted." The timeliness of the center's performance has been abysmal; it must move aggressively and rapidly to overcome both the problems and its poor reputation. That the center appears to

be facing up to its critics and their criticisms is to its credit, but the proof of its intentions will lie in the extent and speed of change and the degree of commitment to improvement, rather than in repeating the words in its statutory mandate.

- The panel recommends that the center explore and develop approaches for expediting response from participants in its studies and techniques for producing usable advance results; use management information systems for monitoring progress through all phases of data collection and reporting; and establish procedures for taking prompt and appropriate actions when required. Similar techniques and monitoring controls should be required as integral components of work done by contractors to the center and should be followed closely to ensure prompt adherence to schedule, with penalties for failure to accomplish work on time.

RESOURCES--STAFF AND BUDGET

The presence of competent, experienced, and dedicated staff, with the required mix of disciplines and expertise, is basic to the success of the center. Given its mission and responsibilities, its needs range across a broad spectrum of talents required in collecting and producing education statistics, ranging from organizational leadership and management skills to clerical and semiprofessional support, and at a minimum, the expertise necessary to collect, process, analyze, and present statistics, whether collected from existing records or obtained directly through surveys or censuses. Furthermore, the staff must have the capacity, capability, and interest to prepare and publish regular analytic reports based on the data. Such efforts develop both a substantive and technical competence and insight on the part of the staff, which result, first, in better data, and, second, in better understanding of the meaning of the data. On a continuing basis, efforts must also be devoted to evaluation and review of the center's methodology and products as one step in exploring and developing future methodology.

Such a diverse menu of needs calls for survey and mathematical statisticians or others with similar expertise, for staff trained in the subject of education and education policy and with analytic skills, and for staff experienced in the needs and practices of states, local education agencies, and other data providers. Competent leadership must set realistic

boundaries of what can be accomplished to protect the organization from unrealistic demands. Once having achieved and demonstrated an acceptable level of competence and accomplishment, an organization can expand and stretch as new needs are encountered. As needed, it also can seek short- or long-term outside assistance. In either case, however, it is essential that what is to be done be done well and within the capabilities, knowledge, and experience of available staff resources.

The panel wishes to emphasize most forcefully its belief that the center staff itself must include sufficient expertise and the required leadership capability to understand, address, and respond to both the technical and related requirements of the demands placed upon it if it is to be perceived as (and in fact is to be) a competent statistical organization. Although it may require outside assistance to meet all of its commitments, it cannot, should not, and must not turn to others for its basic needs.

Given the long history of education statistics and the almost universal agreement on their importance, our exposition of necessary skills, related requirements, and essential attributes for a responsible statistical organization could be viewed as both naive and belaboring the obvious. Unfortunately, such is not the case--the situation at the center leaves much to be desired. During a period of rising demands for more and better information, staffing and budgets have declined significantly. Between fiscal years 1980 and 1984, the number of full-time equivalent employees in the center decreased from 173 to 134, a 23 percent decrease (Congressional Research Service, 1985) and the number in early 1986 has dropped to 111. Adding insult to injury, a report issued in 1984 by the Committee on Government Operations noted that during this same period of overall decline "the Department has required the Agency to fill 14 positions . . . with assigned staff because of RIFs (reductions in force) and reorganizations (elsewhere) within the Department" (Congressional Research Service, 1984:172).

That the problem of adequate and competent staff is not of recent vintage is illustrated by a rather succinct quote from the report of the 1963 advisory group (U.S. Department of Health, Education, and Welfare, 1963:14): "The Office of Education [the predecessor organization to the center] does not have adequate professional staffing. . . ." Of somewhat more recent vintage, it is instructive to note that in a memorandum to division directors in mid-1985, the director noted that efforts to improve quality at the center will not succeed

unless existing staff attitudes that "it doesn't make much difference what I do" are countered and overcome.

During its study, the panel heard not only of the scarcity of staff, but also of the scarcity of skills. Serious questions were raised as to technical competence, particularly in the areas of sampling and survey methodology and of evaluation of the adequacy of products. As an example of this concern, of a staff of 128 permanent full-time members in March 1985, only 11 were classified as mathematical statisticians, and none was located in the office of the director. The panel was also presented with a number of examples of inadequate or incorrect presentation and interpretation of data by center staff. Furthermore, the center was unable to document any recent instances in which staff had prepared and presented technical papers before, or had participated in, meetings of professional associations, such as the American Educational Research Association, the American Statistical Association, the American Sociological Association, or the Population Association of America.

We note the recent establishment by the American Statistical Association of a research fellowship and associateship program, in cooperation with the center, which stands as a very positive development for the center. The program, supported by a grant from the National Science Foundation, will bring to the center for periods of a year or so senior researchers and advanced graduate students to pursue research on any area related to the center's data or methodology.

The inability or unwillingness to respond to the existence of vacancies, particularly when the agency employment level is consistently below its ceiling and when its program obviously is in a state of growth, has been demoralizing and destructive. For example, an interval of about nine months to fill a mid-level statistical position (GS-11) raises doubts as to the commitment of the department to the objectives and needs of the center. Similarly, a personnel ceiling of 129 compared with an on-board staff of 111 (of whom some 90 are classified as professionals) at the time that the Congress has before it a request for a 50 percent budget increase (spring 1986) and that work has already begun on a new, major reimbursable project for another office in the department must also provide some pause.

The recent reports prepared for the Committee on Government Operations of the House of Representatives (Congressional Research Service, 1984, 1985) also document a decrease of 28 percent in budget (when adjusted for inflation) over the five-year period beginning 1980, which resulted

in sharp curtailments in the ability of the staff to visit states to coordinate efforts, review activities, or otherwise interact with providers and users of its data. The effect of the budget and staffing curtailments also has had a direct negative effect on programs. The center's publications shifted away from more detailed analytic report to more limited bulletin or statistical summaries, and even more discouraging has been the absence in recent years of any efforts in validating any of the center's surveys or programs.

These examples inevitably raise the question of leadership. The absence of leadership was mentioned by many who shared their views with the panel. Therefore, it seems obvious that a first requirement of any attempt to deal with the center's problems is for the leaders of the center to demonstrate their capabilities and regain the respect and support, as well as control, of the staff. It also is essential that the lines of responsibility and authority throughout the center be clearly delineated, followed, and supported, and that leaders be held accountable and responsible for their actions or lack thereof.

Recent changes in leadership, both at the center (in late 1984) and in the department (in early 1985) appear to be resulting in some positive changes both in attitudes toward the center and in increased resources. The new leaders appear particularly realistic in their outlook: in the words of the present Assistant Secretary, Office of Educational Research and Improvement, thus far, the center "is not doing enough and not doing it well enough." Both the assistant secretary and the director recognize that a large task lies ahead to "repair errors of the past and nurture for the future;" they have articulated three goals for the center:

to repair the data base;

to add qualitative information on the quantitative base; and

to ensure that the center's products have both utility and quality.

The work that is done by the statistical agency chiefly responsible for understanding the status of the U.S. educational system requires stable and competent leadership and staff that must have substantial quantitative and subject-matter expertise.

- The panel recommends that the center identify the professional and technical staff required to successfully accomplish its mission and initiate an independent review and assessment of the technical and subject-matter qualifications of the present staff.

- The panel recommends that the center initiate an active and continuing recruiting program to obtain staff with the needed skills that are lacking among the present staff.

- The panel recommends that the center devote resources for the purposes of developing innovative approaches, including training and work assignments, to ensure the continuing technical growth and competence of the staff, and that staff accomplishment be rewarded by opportunity for further professional development.

- The panel recommends that the lines of responsibility and authority throughout the center be clearly delineated.

- The panel recommends that the center, as needed, actively solicit the assistance and cooperation of its sister federal statistical agencies in addressing technical issues or problems, to obtain short-run staffing assistance, or in carrying out various facets of its program.

Given the extreme importance the panel places on the development of competent staff--and, in fact, in carrying out its other recommendations for improvements in the center's program--the panel fully expects that the center will curtail its program as may be necessary to free the resources necessary to improve its current operations.

To institutionalize the central place of quality in the work of the center, it is vital that the issue of statistical quality explicitly be made a central component of the center, with a focal point in an Office of Statistical Standards, as recommended above by the panel.

In addition to technical competence, many factors enter into the perception and reality of an organization recognized as outstanding, one responsive to demands and innovative in meeting needs. We have already highlighted the importance of leadership; without vision, direction, and commitment, no organization can long sustain excellence. At a somewhat lower level--but vital nonetheless--are a host of activities or

requirements that set the tone, sustain the momentum, and provide the basis for continual growth and improvement. These include staff recruitment, training, and development; the conscious fostering of communication within the organization and between the organization and its users and providers; coordination of efforts among all the participants; exposure of the organization to outside review and critique of its procedures, methodologies, and products; efforts at consultation, both to provide others with the benefits of the center's expertise and to obtain from others the fruits of their wisdom and experience; and finally, the product of all the above, a sense of morale, that elusive element that binds an organization and makes possible continued accomplishment.

- o The panel recommends that the center staff be given both responsibility and authority for the conduct of individual projects and, accordingly, be held accountable for meeting the established standards of acceptable performance, including timeliness.

- o The panel recommends that the center recognize the value and importance of participating in meetings and activities of professional and technical organizations, including the preparation, presentation, and publication of papers and articles describing aspects of the work of the center and its problems, and that the center devote, and if necessary divert, resources to ensure and support staff participation.

CONTRACTING OUT--OR NOT

Federal government agencies--statistical and nonstatistical--have a range of options in arranging for the performance of their statistical activities. The first level of choice is whether to perform the project with in-house staff or to use the services of an outside organization. If an outside organization, choices include another federal statistical agency, a private survey firm, a university survey center, a nonprofit research institute, a public-interest association, or a unit of state or local government.

Major federal statistical agencies exhibit many different configurations in the arrangements by which they perform their mainstream activities. The Bureau of the Census, for example, serves as a survey data collection and processing agent for many federal statistical and nonstatistical agencies. In contrast, the Center for Statistics has relied heavily on

state and local education agencies for the primary collection of elementary and secondary school data and has contracted out most of its other data collection activities, including such major longitudinal surveys such as High School and Beyond. In addition, it has contracted out for some processing of data received from state agencies and from institutions of higher education. Over all, very little of its work has been carried out directly by its own staff.

The question of the proper role for outside contract services in the performance of a statistical center's primary or core activities is a very difficult one. In the case of the center, a basic problem is that a professional staff the size of the center's (about 90 in spring 1986) cannot be expected to develop and maintain an appropriate level of expertise across all of the technical and subject-matter fields that are required in carrying out its mission and program.

The general adequacy and quality of the survey work and other collection and processing activities carried out by the center depend heavily on its operational capacity to plan, manage, and evaluate technical projects. Similarly, the ability to carry out supervisory or overview functions to the maximum benefit of the center depends heavily on the experience of the staff in having participated directly in one or another of the many facets of direct data collection and processing. Only with such experience can one be expected to recognize fully, understand the meaning of, and react to the measures of quality control, the implications of actions taken or deferred, the significance of patterns of expenditures, and the proper choices among alternatives when plan and performance differ.

- The panel recommends that the center undertake to conduct some projects directly in-house, in order to provide the opportunity for staff to become exposed to and experienced in the variety and multitude of technical activities, problems, and difficulties inherent in such an undertaking and to provide technical competence for the staff in subsequently supervising outside contractors.

With regard to contracting with private organizations, the center has had a range of experiences. The longitudinal studies have received generally favorable reviews from knowledgeable observers. In contrast, the center has had some unpleasant experiences in the nonperformance or inadequate performance of support contractors in the area of operational processing and checking of data from educational

institutions. Although it is not possible to guarantee impeccable, continuing performance on the part of any contractor, it is a major responsibility of center management to recognize early warnings of problem areas and to take immediate and decisive action to correct them. From the opposite viewpoint, contractors have indicated their share of difficulties in dealings with the center. Qualified technical staff to evaluate and review the contractor's work have been and continue to be in short supply, with consequent delays to the program. Specifications once agreed upon have been changed without notice or much discussion, needed decisions have been delayed, the center has spoken often with many different voices--all adding to confusion, loss of time, and less than efficient performance. In each instance, the availability of knowledgeable, competent, and experienced staff is an essential element, first, in anticipating and preventing problems and, second, in dealing with them expeditiously and efficiently if and when they occur. As noted earlier, ensuring data quality must be the center's responsibility.

The panel believes it would be very much to the center's advantage to develop close relationships with other major federal statistical agencies, in particular, the Bureau of the Census. Given the bureau's special role in carrying out work for other federal agencies; given its mix of resources of staff experienced in all aspects of data collection and processing, including the use of both sample surveys and administrative records; and given its past experience in undertaking work for the center, the panel urges the center to explore the establishment of a continuing, substantial relationship between itself and the bureau. Such a relationship might include, among other activities, the conduct of at least one major program for the center by the bureau. Such an undertaking, if feasible, would permit staff of the center to be exposed regularly to technical staff of the bureau and to the problems inherent in all phases of data collection; to participate in the determination of all aspects of the undertaking, including dealing with problems and developing solutions and observing data collection and processing; and to call on the bureau's staff for technical and other assistance in areas other than those involved in their joint relationship. The period of outstanding cooperation a decade ago among staff of the Department of Health, Education, and Welfare, of the center, and of the Census Bureau during the development and conduct of the Survey of Income and Education can serve as a model.

- The panel recommends that the center establish a continuing relationship with the Bureau of the Census and explore the feasibility of joint participation in one or more major programs.

A PUBLICATIONS POLICY

The data products of the Center for Statistics are the culmination of the center's effort, and therefore are the primary vehicle through which the work of the center should be judged. Ineffective publications and incomplete or incorrect data tapes and documentation that fail to serve the needs of data users, publications that contain outdated data, reports in which text and data are inconsistent, reports that fail to detail methodology and provide error measures--all these have been ascribed to the center. Unfortunately, our review of examples of the center's publications confirms the view that the center has had more than its share of problems. In fact, the initial support within the department for a study of the center resulted in large part from concerns with the presentation of results in the center's publications. Many of the recommendations already proposed in the report, if implemented, would result in improvements in the center's publications.

The critical lacks in many of the center's publications come quickly to the fore when its publications are compared with those of other federal statistical agencies: timeliness; the absence of detail on the definitions used or on the sources of the data themselves; any sense of how the data were treated to get them into the form in which they were presented; the treatment of problematic data elements; estimates of the sampling or nonsampling error present in the numbers; disclosure avoidance techniques; information on the use of imputation or weighting procedures. Users find themselves in the dark, unable to make appropriate and necessary judgments on quality and left with a feeling that the data are from an unknown source, of unknown quality, and have been subject to unknown editing and imputation procedures. As a consequence, their ability to make maximum use of the data is restricted by their necessary caution. Such deficiencies lead the panel to emphasize the need for the center to establish standards and to developing mechanisms for monitoring their implementation. Of course not all center publications exhibit the problems we have identified; their existence merely heightens the contrast with those publications

and reports that fail in their objective to inform and enlighten the user.

Our review also indicates clearly the need to upgrade the technological base for producing publications. Few if any of the present publications demonstrate concern with readability, clarity in presentation, and the use of graphs or charts to aid users. The center--and its publications--would benefit through the application of graphic tools for display and analysis. Similar attention should be directed to dissemination and distribution of publications.

An additional area of concern regarding publications and the dissemination of information arose as a result of the recent reorganization of the center, which moved much, if not all, of the dissemination function out of the center. Given that a major function and responsibility of a statistical organization is to understand how and by whom its data are being used, the panel believes that the organization must interact directly and continually with the users of its products. Direct interaction also serves a number of other very important functions, such as allowing those who best understand the data to explain its limitations and meaning to potential users; providing users with the opportunity of learning about other types of data that might better serve their needs or provide a broader understanding of issues being studied; and, finally, providing producers with the opportunity of determining future data needs. The important nature of this activity leads the panel to conclude that close attention must be paid to the operation of the information function under the new organizational arrangement.

- The panel recommends that the center institute a publications policy that sets forth the types of publications--analytic reports, news releases, descriptive reports, statistical summaries and digests, methodological reports, etc.--and other forms of information, such as data tapes, diskettes, on-line reporting capabilities to be made available; audiences to be served; and the frequency of release of data.

- The panel recommends that the center establish, publish, and adhere to a set of fixed release dates for selected key education statistics.

- The panel recommends that the publications policy require that center reports contain information on definitions used; a description of the data collection methodology; provide a measure of reliability, if

applicable; discuss other possible sources of error; and detail other sources of relevant or similar data. Compendia of statistics, such as the *Condition of Education*, should, at a minimum, follow the example of the *Statistical Abstract of the United States* in providing references to source information; similarly, advance or brief highlights reports should contain appropriate references to the sources of such information.

- The panel recommends that the Office of Educational Research and Improvement and the Center for Statistics, given the current organizational separation of the dissemination of data from the preparation phase, monitor and review closely the release of information through the new arrangement and the quality and extent of interaction with users to ensure that appropriate guidance on sources, uses, interpretations, and limitations of the data is provided to those receiving the information.

- The panel recommends that the center initiate a comprehensive review of its technological capabilities, with the objective of developing a short-range plan for providing state-of-the-art capability in the dissemination and distribution of its products.

4

Recommendations

This chapter brings together all the panel's recommendations for the Center for Statistics. They are presented in the order in which they appear in the report.

The panel believes that its recommendations provide a realistic approach to addressing the issues and problems that face the center, both from the realities of the past and present, and from the longer-range perspective of the center as we envision it in the years ahead. Given our findings, we believe that what we propose is critical to the survival of the center as a viable and credible organization. Our recommendations are a comprehensive and integrated set, a package that, taken as a whole, can make the center into a credible statistical agency.

In setting forth its recommendations, the panel is fully mindful of the current budget situation. First, many of its recommendations can be implemented within the current budgetary capacity of the center and will result in significant improvements in the quality, timing, and accuracy of what it does and how it does it. Second, the center must be prepared as needed to curtail program, scope, or activity in order to improve the quality of its work and products. In the view of the panel, less, done well, is far superior to more, done poorly. The panel recognizes and accepts that over time the center will require additional funding; however, it believes that such increases must be judged against the progress of the center in meeting the standards expected of it and should reflect an expected expansion in its program as it demonstrates its progress.

Finally, the panel wishes to emphasize the seriousness of its view that there can be no defense for allowing the center to continue as it has for all too long. It is past time for those in positions of responsibility to face up to the risks and dangers of perpetuating the myriad and continuing prob-

lems of the center. Without strong and continuous commitment and demonstrated determination to undertake wide-ranging actions to change both the image and reality of the center, we are unanimous in our conviction that serious consideration should be given to the more drastic alternatives of abolishing the center and finding other means to obtain and disseminate education data. For our part, we continue to believe strongly that the center has a future and that the preferred course of action is to begin the process of improvement.

MISSION, ROLE, AND RESPONSIBILITIES

The panel recommends that the mission of the Center for Statistics, as stated in Section 406(b) of the General Education Provisions Act, as amended (20 U.S.C. 1221e-1), be strengthened to clearly establish and define the role of the center in assisting the Secretary of Education in determining the data needs for assessing the condition of education in the United States, and for accepting responsibility and accountability for ensuring the availability of the necessary data.

The panel recommends that Congress demonstrate its support for the center and its mission through its budget actions, through its requests for informed statistical advice, through requests for direct testimony from center officials, and through its calls for education data.

The panel recommends that the Secretary of Education demonstrate strong and continued support for the center and its mission through department budget requests, public statements, and in appearances before Congress.

The panel recommends that Congress and the secretary recognize and state their support both for the nonpartisan nature of the center and its statistical independence.

The panel recommends that the secretary designate the center as the functional agency responsible for coordination and technical review of all data collection within the department.

The panel recommends that the secretary designate the center as the focal point of releasing statistical information on education.

The panel recommends that the center assume accountability for the process that leads to the determination of the content of the data to be collected.

CONTENT AND DIRECTION OF DATA COLLECTION PROGRAMS

The panel recommends that the leadership of the center develop mechanisms to assist policy makers in determining their data needs and that the center continue to involve its users in dialogue to determine the most relevant and appropriate content of its data collection efforts.

The panel recommends that the center continue the compilation of program, staff, and financial data from the states, but that it undertake an analysis, jointly with representatives from the states, to ensure that the present program meets both center and state requirements for usefulness, relevance, quality, and reliability. In addition, the content of the data on the condition of education, originating with the states, should be be monitored periodically with the intent of improving the content and thus its joint usefulness to the center and the states.

The panel recommends that the center initiate a sample-based program of data collection focused on individual classrooms and students, designed to facilitate better understanding of the relationships between educational inputs, processes, and outcomes. The sample would not necessarily be able to provide adequate estimates for all individual states, although it should be organized so that states could choose to augment the sample to provide state data.

The panel recommends that sample-based data on educational inputs, processes, and outcomes be made readily available, on a timely basis, to all interested users in the form of public-use tapes, with appropriate masking of characteristics to preclude the identification of individual schools, teachers, or students. The panel believes that the usefulness of center data would be greatly enhanced if its data become widely available as a resource for both policy and research use.

The panel recommends that the center continue to explore the inclusion of longitudinal features in its sample-based survey data and that, as a minimum, small-scale longitudinal

studies be mounted regularly as part of the center's data collection efforts.

ESTABLISHING A FRAME OF REFERENCE

The panel recommends that the center develop a conceptual framework for organizing its program and for setting priorities in light of available resources.

THE ADVISORY COUNCIL

The panel recommends that Congress modify the mandate of the Advisory Council on Education Statistics to a role of technical review and oversight, rather than responsibility for the establishing of statistical standards.

The panel recommends that the Secretary of Education, in support of the center, provide timely written response to the concerns raised by ACES in its annual reports to the secretary, and that Congress periodically hold hearings at which both the secretary and representatives of ACES provide testimony on the status, problems, and progress of the center and the concerns and advice of ACES.

The panel recommends that the members of ACES be selected for their expertise and competence in areas directly related to the center's program.

The panel recommends that the center establish one or more continuing technical advisory groups, in addition to ACES, to meet at least twice per year to review, comment, and advise on the methodology used in the conduct of its work, and to provide the director with objective, outside, independent review of the technical capability of the center's staff or of its products. As required by its changing program needs, the center also should establish ad hoc advisory groups representing the unique technical and subject area skills.

IMPROVING DATA QUALITY

Statistical Standards

The panel recommends that the center develop, publish, disseminate, and implement standards to guide the conduct of all phases of its work, from development of objectives through collection, follow-up, and processing and including the preparation, review, analysis, and publication of results.

The panel recommends that the center establish an Office of Statistical Standards and Methods and move expeditiously to recruit and appoint a chief statistician at the level of assistant director, with responsibility for the establishment and maintenance of statistical standards throughout the center.

The panel recommends that the center, in concert with appropriate state and local education agencies (LEAs) and representatives of institutions of higher education, institute the development and publication of uniform definitions and their continuing review, to ensure the collection of consistent data, such as between different LEAs and states. Such information should be made available regularly in reference handbooks.

The panel recommends that the center undertake a continuing program of evaluation of its methodology and its programs.

The panel recommends that the center disseminate widely the results of its methodological research. Publications in professional journals and presentations at conferences should be strongly encouraged.

The panel recommends that the center require that its reports contain information on definitions used in studies and a description of the data collection methodology, provide a measure of reliability, if applicable, and discuss possible sources of error.

Redesign of the Elementary/Secondary Data Programs: An Example

The panel recommends that the center continue to explore most carefully the appropriate balance between the continuing use of state and local administrative record sources and the use of sample surveys. Although supportive of the use of

sample surveys, the panel does not believe that the center has fully resolved the issues involved in shifting the elementary/secondary data collection system from one based on administrative records to one based solely on an integrated sampling survey approach. The panel endorses the efforts of the center in seeking new approaches to accomplishing its mission and suggests that small-scale testing within one or a few states be undertaken to establish procedures, define problems and develop solutions, refine the approach and, overall, assess the feasibility and cost of the survey proposal.

Detecting and Reducing Error

The panel recommends that the center routinely make its users aware of the quality of the data and the limitations inherent in their use.

The panel recommends that the center foster a climate of openness in dealing with all elements of its constituency, including other parts of the department, other government agencies, Congress, providers and users of its data, and its professional peer groups.

The panel recommends that the center initiate a comprehensive program to assess and improve, where necessary, the quality, consistency, and reliability of data obtained from state and local agencies, from institutions of higher education, and from other sources. Meetings, discussions, visits, and technical assistance, including the training of local and state officials on what is required of them and their systems, must comprise a major component of the program.

The panel recommends that the center establish standards for review of data releases and institute procedures to effect them.

TIMELINESS

The panel recommends that the center explore and develop approaches for expediting response from participants in its studies and techniques for producing usable advance results; use management information systems for monitoring progress through all phases of data collection and reporting; and establish procedures for taking prompt and appropriate actions when required. Similar techniques and monitoring controls should be required as integral components of work

done by contractors to the center and should be followed closely to ensure prompt adherence to schedule, with penalties for failure to accomplish work on time.

RESOURCES--STAFF AND BUDGET

The panel recommends that the center identify the professional and technical staff required to successfully accomplish its mission and initiate an independent review and assessment of the technical and subject-matter qualifications of the present staff.

The panel recommends that the center initiate an active and continuing recruiting program to obtain staff with the needed skills that are lacking among the present staff.

The panel recommends that the center devote resources for the purposes of developing innovative approaches, including training and work assignments, to ensure the continuing technical growth and competence of the staff, and that accomplishment be rewarded by opportunity for further professional development.

The panel recommends that the lines of responsibility and authority throughout the center be clearly delineated.

The panel recommends that the center, as needed, actively solicit the assistance and cooperation of its sister federal statistical agencies in addressing technical issues or problems, to obtain short-run staffing assistance, or in carrying out various facets of its program.

The panel recommends that the center staff be given both responsibility and authority for the conduct of individual projects and, accordingly, be held accountable for meeting the established standards of acceptable performance, including timeliness.

The panel recommends that the center recognize the value and importance of participating in meetings and activities of professional and technical organizations, including the preparation, presentation, and publication of papers and articles describing aspects of the work of the center and its problems, and that the center devote, and if necessary divert, resources to ensure and support staff participation.

CONTRACTING OUT--OR NOT

The panel recommends that the center undertake to conduct some projects directly in-house, in order to provide the opportunity for staff to become exposed to and experienced in the variety and multitude of technical activities, problems, and difficulties inherent in such an undertaking and to provide technical competence for the staff in subsequently supervising outside contractors.

The panel recommends that the center establish a continuing relationship with the Bureau of the Census and explore the feasibility of joint participation in one or more major programs.

A PUBLICATIONS POLICY

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of information through the new arrangement and the quality and extent of interaction with users to ensure that appropriate guidance on sources, uses, interpretations, and limitations of the data is provided to those receiving the information.

The panel recommends that the center initiate a comprehensive review of its technological capabilities, with the objective of developing a short-range plan for providing state-of-the-art capability in the dissemination and distribution of its products.

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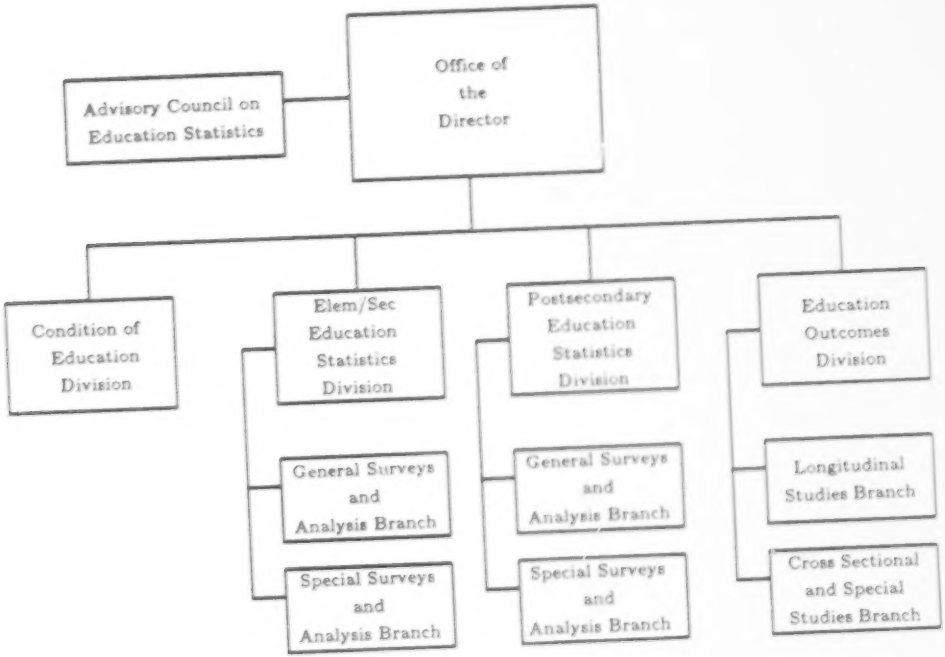
Appendix A

Organizational Structure of the Center

During the panel's tenure, the Center underwent a number of reorganizations, including a renaming, from the National Center for Education Statistics to the Center for Statistics. Shown on the following pages are the organizational structure of the center, as of April 1986, and a listing of the program content and staffing of each of the organizational components.

CENTER FOR STATISTICS


Advisory Council on Education Statistics
Office of the Director
Condition of Education Division
Elem/Sec Education Statistics Division
General Surveys and Analysis Branch
Special Surveys and Analysis Branch
Postsecondary Education Statistics Division
General Surveys and Analysis Branch
Special Surveys and Analysis Branch
Education Outcomes Division
Longitudinal Studies Branch
Cross Sectional and Special Studies Branch

CONDITION OF EDUCATION DIVISION

Condition of Education Division

20 professional
3 support

Indicators
Condition of Education
Digest of Education Statistics
Projections of Education Statistics
Allocations
Data on Vocational Education

ELEMENTARY/SECONDARY EDUCATION STATISTICS DIVISION

Elem/Sec Education Statistics Division

1 professional
1 support

Elementary-Secondary Redesign

General Surveys and Analysis Branch

11 professional
1 support

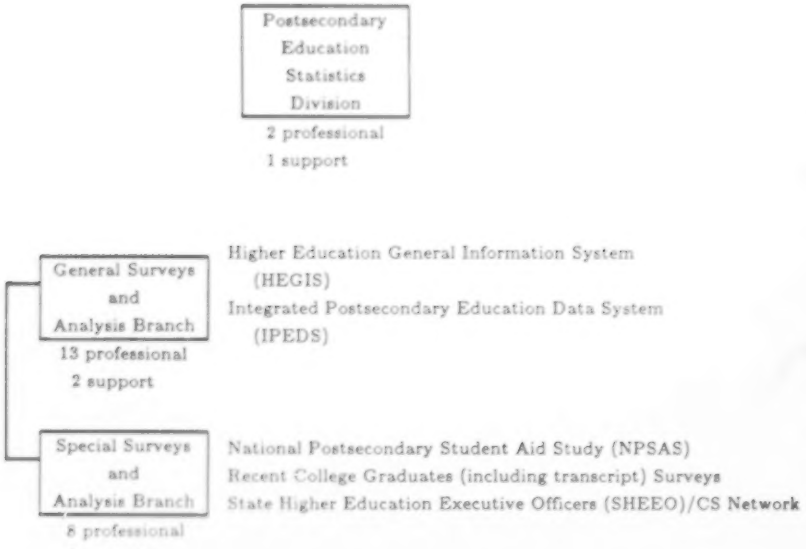
Common Core of Data (CCD)
CCSSO Education Data Improvement Project

Special Surveys and Analysis Branch

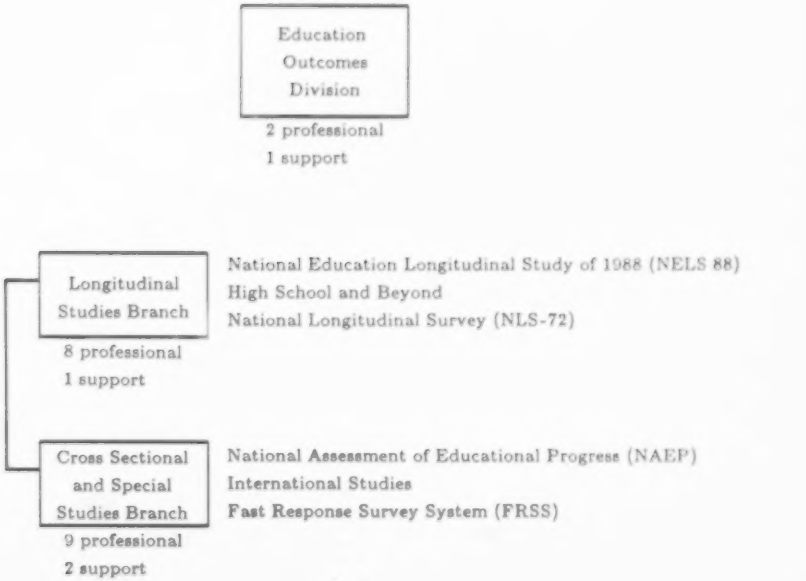
9 professional
1 support

Public/Private School (including libraries) Surveys
School and Staffing Surveys
LEA Teacher Supply and Demand Survey

POSTSECONDARY EDUCATION STATISTICS DIVISION


Postsecondary Education Statistics Division
2 professional
1 support
General Surveys and Analysis Branch
13 professional
2 support
Higher Education General Information System (HEGIS)
Integrated Postsecondary Education Data System (IPEDS)
Special Surveys and Analysis Branch
8 professional
2 support
National Postsecondary Student Aid Study (NPSAS)
Recent College Graduates (including transcript) Surveys
State Higher Education Executive Officers (SHEEO)/CS Network

EDUCATION OUTCOMES DIVISION



Appendix B
Biographical Sketches of Panel Members and Staff

VINCENT BARABBA is executive director of market research and planning at General Motors Corporation, Detroit, Michigan. He was formerly director of the U. S. Bureau of the Census and director of market intelligence, Eastman Kodak Company. His current research interests are in knowlege utilization. He is a fellow and former vice president of the American Statistical Association, a member of the International Statistical Institute, and on the board of directors of the Social Science Research Council. He received undergraduate degrees in advertising and marketing from Woodbury Business College and California State University and an M.B.A. degree in marketing from the University of California, Los Angeles.

ANTHONY S. BRYK is associate professor in the Department of Education at the University of Chicago, chairs the departmental computer committee, and oversees the operation of the department's computer center. He has been both administrator and senior research associate at the Huron Institute, a firm of applied research, evaluation, and policy analysis. His current research interests are in applications of hierarchical linear models to educational research, the sociopolitical organization of the evaluation context and its implications for the role and training of applied social scientists, and the social organization of Catholic schools. He received a B.S. degree from Boston College in chemistry and an M.Ed. degree from Harvard University in measurement and statistics.

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